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SOCIOMETRY

EDITORIAL POLICY

Sociometry is concerned with the entire range of interests and problems represented by research in social psychology. It is the policy of the editors to seek those manuscripts for publication which represent the significant research interests of investigators who are concerned with giving the field of social psychology theoretical structure and reporting research which is clearly focused, well designed, and competently conducted.

While social psychology is presently regarded by most as a field with indeterminate boundaries, it has as its central focus the investigation of the processes and products of social interaction at the interpersonal, intrapersonal, intergroup, and intragroup levels and the development of significant generalizations therefrom. In keeping with the more general meaning of the name of the journal emphasis will be placed on measurement of social behavior. However, this emphasis does not exclude the acceptability of good articles which must rely upon qualitative materials and analyses.

The editors and editorial consultants can be expected to subject manuscripts to rigorous criticism and screening according to the best standards of scientific research and at the same time avoid a sterile orthodoxy which would stultify the communication of creative ideas at the growing edge of the science. Thus the journal will strive to be flexible in its response to the publication needs of its contributors.

It is the intention of the editors to avoid any tendency toward professional provincialism and to invite contributions from any sector of the scientific community which promise to further the objectives of the journal.

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Editorial

With this issue, a new Editor begins his stewardship. The Editorial Policy, enunciated by Leonard S. Cottrell, Jr. and carried on the facing page, remains unchanged. The new Editor's predecessor shall be his role model as well. Perhaps it is appropriate to expound a bit on two or three sentences of the statement of Editorial Policy.

"*Sociometry* is concerned with the entire range of interests and problems represented by research in social psychology." It is concerned with the socialization process and with the study of the interrelationships of social structure and personality, as well as with studies of group process; it is concerned with conceptualization as well as with measurement. It is as concerned with the study of conforming behavior as with that of deviance; with studies of behavior in natural settings as with contrived experiments. It is concerned with mass movements and collective behavior; with cross-cultural studies and sub-cultural studies. To enumerate is to risk exclusion. This we do not wish to do on either substantive grounds or in terms of methodological approach.

Sociometry seeks to "represent the significant research interests of investigators who are concerned with giving the field of social psychology theoretical structure and reporting research which is clearly focused, well designed and competently conducted." This does not, of course, mean that every paper must be oriented toward major theoretical issues, but the editors may be expected to reject a manuscript reporting the most beautifully designed and executed study if they believe it to be trivial from a theoretical point of view. It may be less necessary to emphasize that *Sociometry* is a journal of research; its interest in theoretical structure is for the organization of empirical knowledge, to broaden and extend ability to generalize beyond the particular instance.

Many talents, disciplined in varied ways, will be required to build the science of social psychology to which we are dedicated. The editors of *Sociometry* represent a wide range of interests, approaches and competences. Each of us will vary somewhat in the emphases and interpretations to be placed on any formal statement of policy, but we are all committed to publishing those manuscripts of quality, whatever the approach, which promise fruitful contribution to research in social psychology. A few articles will be comprehensible to only a small proportion of our readers—and of our editors! Our hope, however, is that through *Sociometry* the most significant technical developments and the most cogent theoretical formulations in social psychological research can be presented and interpreted to a broad professional audience. If *Sociometry* can serve this purpose, its editors will be gratified. They will welcome the comments of readers, especially suggestions for the improvement of this JOURNAL.

THE EDITOR

A Formal Interpretation of the Theory of Relative Deprivation

JAMES A. DAVIS, *University of Chicago*

National Opinion Research Center is currently conducting a study of financial and other factors affecting the career decisions of graduate students in the traditional arts and sciences. In casting about for theoretical tools, it occurred to us that the lot of the American graduate student might be characterized, not as one of actual economic destitution but as one of *relative* deprivation of the famous sort experienced by American soldiers in World War II. It occurred to us that if this were the case, the "theory of relative deprivation" might explain a good deal of our data.

We quickly turned to the major writings on that theory. The original conceptualization, of course, occurs in *The American Soldier* (3) volumes and a famous critique of the concept appears in an essay by Merton and Kitt (2). Rereading these two works left us short of our goal. While *The American Soldier* text was highly informal and the theory was uncoded (Merton and Kitt note that nowhere in *The American Soldier* is relative deprivation defined), the Merton and Kitt theory is devoid of substantive propositions about relative deprivation. In order to bridge this gap we proceeded to spell out, in a relatively formal fashion a theoretical system, which will encompass most of the Research Branch authors' interpretations of relative deprivation. We do not claim that this is the theory the Research Branch authors actually used, but we do believe that the theory goes some distance in making explicit the arguments which appear in *The American Soldier*.

Furthermore, we do not claim that the theory is "true" in the sense that everything now known about human behavior tends to substantiate it. Rather, it is our belief that the system of propositions is logically consistent, has an empirical reference, and can generate hypotheses for testing. Empirical studies of the hypotheses may result in their rejection or, more probably, their limitation to specific circumstances and situations. However, we believe that one of the advantages of such codification is that the assumptions can be confirmed or rejected only when they have been spelled out. The remainder of this essay then is devoted to an exposition of the theory.

THEORY

Let us consider some population which can be partitioned in one or more ways into dichotomous classes (e.g., married v. not married or drafted v. not drafted). Our first assumption is as follows:

1. At least one of these partitionings is considered throughout the population to reflect differences in desirability. Such a partitioning divides the population into two classes, the *deprived* and the *non-deprived*, the latter state being universally preferred to the former.

Assumption 1 amounts to saying that one or more of the partitions are in terms of a "value" on which there is consensus in the population. It does not assume that everyone outside the universe would agree on this evaluation. Thus, membership in the Communist Party would not have the same deprivation status in an analysis of the U. S. as it would in an analysis of the U.S.S.R. In addition, we should note that we are only assuming "ranking" here and do not require that the deprived experience pain, only that deprivation be acknowledged as less desirable than non-deprivation. The theory does not claim that in all social groups one will find consensus in values. Rather, the theory considers some of the consequences of situations where there is consensus. Where people do not agree on values, relative deprivation can also occur, but the amount of relative deprivation in a given group will not then be a simple function of the variables we are outlining.

In order to develop the specific implications of the theory, we will use as our tool a "comparison matrix." This may be defined as a symmetrical matrix in which rows and columns consist of the cross-partitioning of the population classes, the rows being associated with ego and the columns being associated with alter, although the entire matrix is from the "viewpoint" of ego. While this will serve as a formal definition, its interpretation is not obvious. The purpose of the matrix is to list all possible comparisons in the system under consideration. Since each comparison consists of a certain type of ego (e.g., a deprived ego) comparing himself with a certain type of alter (e.g., a non-deprived alter), when we specify all the possible types of egos paired with all the possible types of alters, we have listed all of the possible comparisons. Since the possible types of egos are identical with the possible types of alters, and each is given by the cross-partition of the classes in the population, our definition apparently will serve to produce a list of possible comparisons.

Let us consider two specific examples. If no population characteristics other than deprivation are included in the analysis, the most simple type of comparison matrix is as follows:

TABLE 1

Comparison Matrix (from the Viewpoint of a Given Ego) for a Population Partitioned on Deprivation Only

		Alter	
		Deprived	Non-Deprived
Ego	Deprived	a	b
	Non-Deprived	c	d

Four types of comparison are possible, as designated by the letters in the four cells. To anticipate our argument somewhat, cell "b" is what produces relative deprivation according to the theory.

When we add a second social category, the possibilities increase considerably. In general, given n categories in the analysis, the comparison matrix will consist of $(2^n)^2$ cells, since there are 2^n combinations of dichotomous characteristics in any given population, and the matrix consists of identical rows and columns.

Let us now turn to assumptions 2 and 3.

2. Within the population, comparisons are random.

Assumption 2 is rather important, both technically and substantively. From a technical point of view, it enables us to use the calculus of probabilities as a language for deriving hypotheses from the theory. Thus, if the probability of comparison X is the same as the proportion X, and the probability of comparison Y is the same as proportion Y, and all comparisons are random, then it follows that the probability of a person comparing with X and also with Y is the product of the two probabilities.

From a substantive point of view, the assumption may appear dubious. However, we have little or no empirical data on how people actually do compare, and until enough evidence is gathered to refute the assumption, we see no reason to introduce a more complicated one. Taken together, assumptions 1 and 2 suggest an implicit "realism" in the theory. While we certainly do have evidence that social perceptions are often distorted by needs and social structural location, the theory of relative deprivation (implicitly in *The American Soldier* and explicitly in this essay) tends to assume fairly simple situations in which individual variation in perception and evaluation is small. This may be a good place to comment on the relations between the theory of relative deprivation and Festinger's theory of social comparisons (1). While we have not worked out the formal relations between the two, it appears that both theories treat the same empirical phenomenon, with this difference: the theory of relative deprivation treats the consequences for the group where perceptions and evaluations are unambiguous; the theory of social comparisons treats the consequences for the individual of comparisons where perceptions and evaluations are ambiguous. It thus appears that both theories are special cases of some more general uncoded theory, which can specify the circumstances where the Festinger model applies and the circumstances where the relative deprivation model applies.

Now that we have defined the possible types of comparisons and their frequency, let us turn to the heart of the theory, a set of assumptions about the psychological consequences of various types of comparisons. To do so, however, we must introduce a further distinction. If we consider any social cate-

gory other than deprivation, we can divide the comparisons into two types, (a) in-group comparisons or comparisons between people in the same sub-category and (b) out-group comparisons or comparisons between people in different categories. Thus, when married men compare with married men this is an in-group comparison; when enlisted men compare with officers, this is an out-group comparison. Now, let us specify our assumptions.

In-Group Comparisons

3. If a person (ego) compares himself with a person (alter) when ego and alter differ in their deprivation, ego experiences a subjective feeling opposite in direction to the evaluation of alter's condition.

a. When a deprived person compares himself with a non-deprived, the resulting state will be called "relative deprivation."

b. When a non-deprived person compares himself with a deprived person, the resulting state will be called "relative gratification."

4. A person experiencing *either* relative gratification or relative deprivation will also experience a feeling that his deprivation status is different from that of his peers. We will call this "fairness," in the sense that it indicates a belief that there is differential treatment in the in-group.

Assumption 4 says that a cross-comparison will result in a person's feeling that his treatment is different from that of his peers, while assumptions 3 a. and 3 b. predict how he will feel about it. 3 a. and 3 b. are the most common arguments used in *The American Soldier*, and in the text are implied by such statements as:

... comparing himself with his married civilian friends he (the drafted married man) could feel that he had been called on for sacrifices which they were escaping altogether. (AS I, p. 125) (Relative Deprivation)

... Relative to most Negro civilians whom he saw in Southern towns, the Negro soldier had a position of comparative wealth and dignity. (AS I, p. 563) (Relative Gratification)

A similar set of assumptions may be specified for out-group comparisons.

Out-Group Comparisons

5. If a person (ego) compares himself with a person (alter) in an out-group when ego and alter differ in their deprivation, ego will experience a feeling toward alter's group opposite in direction to the evaluation of alter's condition.

a. When a deprived person compares himself with a non-deprived out-group member, the resulting attitude toward the out-group will be called "relative subordination."

b. When a non-deprived person compares himself with a deprived out-group member, the resulting attitude toward the out-group will be called "relative superiority."

6. A person experiencing either relative subordination or relative superiority

will also experience a feeling that his deprivation status is different from that of the out-group. We will call this "social distance."

Assumptions 5 and 6 are analogues of 3 and 4 at the inter-group level rather than the intra-group level.

These six assumptions complete the theory. Whether they are "true" or not is, of course, unknown without considerable empirical research. Furthermore, we should emphasize that although the analysis of false theories is not always the best investment of time and effort, our interest is not in truth or falsity *per se*, but rather in whether our theory will successfully codify the reasoning used by the Research Branch authors. Our claim is that in ten out of eleven examples it does.

Before proceeding to specific cases, let us draw a few inferences from our theory for use in the analyses. From assumption 2 and from the appropriate assumptions in 3 through 6 we can, by elementary probability theory,¹ define the expected probabilities for our various phenomena. Considering P_A as the probability of deprivation among the A's and Q_A as the probability of non-deprivation among the A's, we get the following: (All inferences from the theory will be given Arabic numerals.)

1. The proportion of persons in A experiencing relative deprivation = $P_A \times Q_A$
2. The proportion of deprived in A experiencing relative gratification = $P_A \times Q_A$
3. The proportion of deprived in A experiencing relative deprivation = Q_A
4. The proportion of non-deprived in A experiencing relative gratification = P_A
5. The proportion of A's experiencing a feeling of unfairness = $2(P_A \times Q_A)$
6. The proportion of A's experiencing relative subordination = $P_A \times Q_{NA}$
7. The proportion of A's experiencing relative superiority = $Q_A \times P_{NA}$
8. The proportion of A's experiencing social distance = $(P_A \times Q_{NA}) + (Q_A \times P_{NA})$

We can illustrate the fashion in which we developed the eight inferences by considering two of them in detail. Inference 1 considers the proportion of people among those possessing attribute A who experience relative deprivation. Now, according to the theory, an A will experience relative deprivation in the following combination of circumstances: when he is deprived himself, and when he compares with a non-deprived A. Now, the proportion of A's who are deprived is P_A by definition; the probability that an A, regardless of his deprivation status, will compare with a non-deprived A equals the proportion

¹ To keep the argument simple we shall assume throughout that the number of persons in the in-group is so large that the subtraction of ego himself from the population of alters has only a negligible effect on the probabilities.

of non-deprived A's (from assumption 2); hence, the probability of the joint occurrence among the A's consists of the product of the two probabilities, i.e. $P_A \times Q_A$. Inference 8 will serve as another example. Social distance, by definition, arises when a person in a given category compares with an out-group member who differs in deprivation. This can happen two ways: a deprived ego comparing with a non-deprived out-group alter, or a non-deprived ego compared with a deprived out-group alter. Using the same arguments as in example 1, the expectation for the first type is ($P_A \times Q_{NA}$) or the probability (among the A's) that ego is deprived times the probability that the out-group alter with whom he compares is non-deprived. The expectation for the second is similarly ($Q_A \times P_{NA}$) and the amount of social distance is the sum of the two.

Obviously, all of the equals signs in the equations must be read with a slight grain of salt, since we can hardly expect that any dichotomous social science measure of relative deprivation would yield the precise probabilities predicted, given inherent difficulties of measurement. Thus, technically, the equals signs should be read as "is a linear function of." However, since the use to which the theory will be put is limited to comparing social systems in terms of more or less deprivation, rather than estimating exact proportions, the qualification does not affect the following arguments.

In short, all of the parameters implied by the theory may be deduced from the distribution of deprivation in the sub-classes.

EXAMPLES FROM THE AMERICAN SOLDIER

We shall consider eleven specific examples of relative deprivation reasoning. Merton and Kitt list nine in their essay (MK pp. 43-45). In addition we discovered one more, and divided their example number 6 into two parts. We shall use the MK numbering, adding number 10 for our serendipitous discovery and dividing number 6 into 6 a. and 6 b. Of the eleven, it is our belief that the theory successfully formalizes ten. This, of course, is not amazing, as this is precisely what the theory was designed to do.

We will begin with our failure (MK number 3). The Research Branch authors say:

With higher levels of aspiration than the less educated, the better educated man had more to lose in his own eyes and in the eyes of his friends by failure to achieve some sort of status in the Army. Hence, frustration was greater for him . . . (AS I, p. 153)

The authors here treat an intra-personal comparison, not an inter-personal one, and thus fall more within the boundaries of the Festinger theory than the theory of relative deprivation. The argument is thus irrelevant to the theory, not contradictory.

Let us begin with the three simplest cases (1, 2, and 10). In each only a single partitioning is considered in addition to deprivation, and the dependent variable is of the type considered in inference 3 from our theory.

MK 1. Married and Single Drafted Men

The Research Branch authors actually use two arguments in this case, only one of which follows from our model. Since Merton and Kitt reproduce the non-model argument we can begin by introducing another quotation from the same page:

A further element must have been important psychologically to those married men who were drafted. The very fact that draft boards were more liberal with married than with single men provided numerous examples to the drafted married man of others in his shoes who got relatively better breaks than he did. . . . Hence, the married man, on the average, was more likely to come into the army with reluctance and, possibly, a sense of injustice. (AS I, p. 125)

In terms of the theory, the authors' argument may be put as follows: the value of P is greater for single than for married men; therefore Q is greater for married men than for single; consequently, since feelings of relative deprivation among the deprived increase with Q (inference 3), drafted married men will be more likely to experience relative deprivation.

MK 2. High and Low Education and Reactions to Draft

The argument here is exactly the same as in case 1, the critical quotation being:

On the average, the non-high school man who was inducted could point to more acquaintances conceivably no more entitled to deferment than himself, who, nevertheless, had been deferred on occupational grounds.

MK 10. Age and Reaction to the Draft

Although not cited in the Merton and Kitt essay, the following example is almost identical:

. . . a larger proportion of older men than of younger men got deferment in the draft . . . thus providing the older soldiers, like the married soldiers, with ready made examples of men with comparable backgrounds who were experiencing less deprivation. (AS I, p. 126)

The interpretation would be the same as in the previous two examples.

Examples 1, 2, and 10 not only seem to fit the theory, but they also suggest two more inferences about relative deprivation in general.

9. If a given social categorization is correlated with objective deprivation, relative deprivation will be more frequent among the deprived in the *more* favored category.

10. If a given social categorization is correlated with objective deprivation, relative gratification will be more frequent among the non-deprived in the *less* favored category.

Each of these can be developed from a definition of correlation as a disproportion between the levels of deprivation in sub-categories. The inferences not only serve as a concise way of summarizing the three examples, but they also provide a tool for further analysis, as they suggest that additional inferences may be developed through using the known algebraic properties of measures of association. This will be particularly helpful when we turn to analyze systems with larger numbers of social categories.

Examples 4, 6a., 7, 8, and 9 may be grouped together as instances in which two social categories or partitions, in addition to objective deprivation, are used in the arguments about relative deprivation. As might be expected, the implicit inferences from the theory are more complex than in the previous examples; but again we can derive certain general inferences from our assumptions which appear to cover the situation. We can begin with example 6a.

MK 6a. Longevity, Education and Promotion

... those soldiers who had advanced slowly relative to other soldiers of equal longevity in the Army were most critical of the Army's promotion opportunities. But relative rate of advancement can be based on different standards by different classes of the Army population. For example, a grade school man who became a corporal after a year of service would have had a more rapid rate of promotion compared with most of his friends at the same educational level than would a college man who rose to the same grade in a year. Hence, we would expect, at a given rank and longevity, the better educated would be more likely to complain of the slowness of promotion. . . . (AS I, p. 250)

The same argument may be recast in terms of correlations, as follows:

1. There is a positive correlation between longevity and promotion.

Therefore (from inference 9), non-promoted of high longevity will show more relative deprivation than non-promoted of short longevity.

2. There is a positive correlation between education and promotion, within each longevity group.

Therefore (from inference 9), non-promoted of high education should show greater relative deprivation than non-promoted of low education.

From these propositions, the authors deduce, in effect, that the inference from proposition 2 should hold within longevity levels (i.e., the partials do not vanish when longevity is held constant).

It can be shown from the theory that the argument is valid.

Consider the following layout of the variables: promotion, longevity and education.

Now, what the authors are trying to prove is that there is more relative deprivation in cell "d" than in cell "b" and there is more relative deprivation

TABLE 2
Promotion, Longevity, and Education

		Promoted	Not Promoted
High Longevity	Low Education	a	b
	High Education	c	d
Low Longevity	Low Education	e	f
	High Education	g	h

in cell "h" than in cell "f" (i.e., the correlation between education and relative deprivation does not disappear when longevity is partialled out).

In the following table we can list the out-group cells with which each of our groups DO NOT compare.

Now, the difference in the relative deprivation of any two groups must be due to those groups which are used as comparisons by one and not the other, since the common comparisons have no effect on differences in relative deprivation. Let us then consider our two pairs of cells:

The difference between "b" and "d" is that the b's compare with e-f, and do not compare with g-h; while the d's compare with g-h, and not e-f. Now, the author's assumption that the correlation between education and promotion holds within longevity groups amounts to saying that there are more promoted in g-h than there are in e-f. This means, then, that the d's (who DO compare with g-h, and not with e-f) are more likely to compare with a promoted person and hence experience relative deprivation. The same argument can be applied in each of the levels of the table, with the following general inferences.

11. If A and B are social categories in the comparison system, and A has a consistent relationship with deprivation when levels of B are introduced as a test variable, A will have a correlation with relative deprivation within both levels of B, the correlation being opposite in sign to the correlation between A and objective deprivation.

This, in turn, will generate the following inferences:

12. If A and B are social categories, and (a) the correlation between A

TABLE 3
Non-In-Group Comparisons

Group	Not an In-Group Comparison
d	e, f,
b	g, h
h	a, h,
f	c, d

and objective deprivation differs in size or sign within levels of B and (b) within a specific level of A there is no correlation between B and objective deprivation, there will be a correlation between B and relative deprivation within the level of A specified by 2.

MK 8 and 9. Race, Region, and Deprivation

Inference 12 may not appear to be intuitively clear, but it is the implicit argument used by the Research Branch authors in their analysis of race, region, and deprivation.

These are really the same example and may be summarized as follows:

... the psychological values of Army life to the Negro soldier in the South relative to the Southern Negro civilian greatly exceed the psychological values of Army life to the Negro soldier in the North relative to the Northern Negro civilian. (AS I, p. 564)

Considering only Negroes, the following will re-state the argument in terms of our theory:

1. The correlation between civilian-soldier and objective deprivation varies by region. In the North (to over-state the argument to make the point clear) the correlation is negative (soldiers are more deprived than civilians); while in the South the correlation is positive (soldiers are less deprived than civilians).

2. There is no difference in the objective deprivation of Negro soldiers in the North and Negro soldiers in the South.

Thus, according to inference 12, there will be a correlation between region and relative deprivation among soldiers, even though their objective deprivation is no different.

Example MK 7, which concerns rank, longevity, and promotion, is identical in its assumptions with example 6 and the conclusion follows from inference 11, given the author's implicit assumption that there is a correlation between longevity and promotion within each rank. We shall not then discuss this in detail.

MK 4. Combat and Overseas Service

Our last multi-variable case, MK 4, is of a different nature, and therefore, should be examined in some detail. The problem is that of explaining why there is only a small difference in the attitudes of soldiers stationed in the U. S. and non-combat troops overseas, despite a definite difference in objective deprivation. The Research Branch authors analyze the problem as follows:

In general, it is, of course, true that the overseas soldier, relative to soldiers still at home, suffered a greater break with home ties and with many of the amenities of life in the United States . . . But it was also true that, relative to the combat soldier, the overseas soldier (in rear areas of an active theater) not in combat and not likely to get into combat suffered far less deprivation than the actual fighting man. (AS I, p. 172)

Rather than two "social" categories, this example considers two deprivation categories—being overseas and being in combat. Their cross-partitioning would give the following:

TABLE 4
Combat and Station Comparisons

	Combat	Non-Combat
U. S.	a	b
Overseas	c	d

One of the combinations (combat soldier in U. S.) does not occur empirically. Now, let us consider soldiers in the "c" cell. Their in-group comparisons will be "b" and "a," and other "c's." That is, in comparing themselves with other overseas soldiers, they will include those in combat, and in comparing themselves with other non-combat soldiers they will include those in the U. S. When they compare with "a's" they will suffer relative deprivation; but when they compare with "b's" they will enjoy relative gratification. Thus, the existence of the "b" cell tends to offset the relative deprivation produced by the comparison with "a's." Now, according to the theory at least, this solace is not available to those in the "a" cell, since for them "b" is an out-group comparison, and the theory assumes that only comparisons with people in the same logical classes produce relative deprivation or gratification.

We may summarize the preceding sections by saying that inferences which follow deductively from the assumptions of the theory have enabled us to formalize the arguments used by the Research Branch authors in eight of the eleven examples collected in the Merton-Kitt article. Furthermore, although we can not claim complete codification by any means, the analysis has suggested that relative deprivation hypotheses, as here formulated, can be formalized and codified through the well known systems for deducing conclusions from the inter-relationships of correlations. This property of the theory should make it amenable to testing with "survey" type data as well as through experimental techniques.

Only one of the examples in *The American Soldier* treats attitudes towards an out-group as the dependent variable, although these attitudes are as important in the general theory as relative deprivation and relative gratification. Example 5 may be summarized as follows:

MK 5. Officers and Men

... the less the differential between officers and men in the enjoyment of scarce privileges—the extreme case being that of actual combat—the less likely was the enlisted man to be critical of the officers. ... (AS I, p. 181)

The dependent variable here is what we have called "relative subordination," and the expected probabilities are given by inference 6 in the theory.

The problem is to assess in more formal terms what is meant by "the less the differential." This may mean either the absolute level of deprivation in the system or the correlation between the category and deprivation. Now, according to inference 6, the thing we are interested in is $P_A \times Q_{NA}$. If differential means correlation only, increasing the correlation, while holding the absolute level of deprivation constant, amounts to adding the value of P_A , subtracting from the value of P_{NA} and thus adding to the value of Q_{NA} . Obviously the product $P_A \times Q_{NA}$ must increase as "discrimination" against the A's increases. What, on the other hand, happens if we mean "absolute" difference in deprivation? We can think of this effect as adding a certain probability to both P_A and P_{NA} , thus subtracting it from Q_{NA} . If we think of this addition as X , the new formula for relative subordination among the A's becomes:

$$RS = (P_A + X)(Q_{NA} - X) = P_A Q_{NA} + Q_{NA} X - P_A X - X^2$$

The value of this formula will be decreased whenever $P_A X + X^2$ is greater than $Q_{NA} X$, or whenever $P_A + X^2$ is greater than Q_{NA} . The exact circumstances will vary with the value of X , but it is clear that even when X is very small if both P_A and P_{NA} are greater than .50, addition of a constant to both probabilities will lower the relative subordination of the A's. In short we may conclude that, when deprivation rates are high in both classes, adding a constant to the deprivation of both groups will decrease relative subordination. Thus, both definitions of "differential" tend to support the authors' informal reasoning.

We can now add the following inferences:

13. When the total rate of deprivation is held constant, relative subordination varies directly with the correlation between the social category and objective deprivation.

14. When correlation is held constant, raising the deprivation probabilities in both social classes equally will decrease the amount of relative subordination if (a) the increment of deprivation is quite large and/or (b) deprivation rates in both classes were quite high initially.

MK 6b. Fairness

Example 6 b. is the famous comparison between attitudes toward promotion in the Air Force and the Military Police. The Research Branch authors begin with the following:

Air Corps men tended to take a dimmer view of promotion opportunities for men of ability in the Army than did the Military Police . . . chances of promotion in the Military Police were about the worst in any branch of the Army—among this sample of men in

the Army one to two years, only 24 per cent of the MP's were noncoms as compared with 47 per cent of the Air Corps men. (AS I, p. 251)

Considering this to be anomalous, the authors advance the following argument:

But consider a high school graduate or college man in the Military Police with Army longevity of one to two years. The chances of his being a noncom were 34 out of 100. If he earned the rating, he was one of the top third among his fellows. If he failed to earn the rating, he was in the same boat with two thirds of his fellows with equal schooling. Contrast him with the Air Corps man of the same education and longevity. The chances of the latter's being a noncom were 56 in 100, based on the proportions in this sample at this time. If he had earned a rating, so had the majority of his fellows in the branch, and his achievement was less conspicuous than in the MP's. If he had failed to earn a rating, while the majority had succeeded, he had more reason to feel a sense of personal frustration, which could be expressed as criticism of the promotion system. . . (AS I, p. 251)

In our terms, the authors are comparing two separate subsystems (they make no claim that Air Force men compare with Military Police) in terms of fairness (the survey question was "Do you think a soldier with ability has a good chance for promotion in the Army?"). Now, according to the theory (Inference 5), unfairness should equal 2PQ. Since P equals .34 in the Military Police, and .56 in the Air Force, the expected "unfairness" is as follows:

TABLE 5
Expected Proportion Experiencing Feelings of Unfairness

Air Force	.49
Military Police	.45

Two aspects of this interpretation deserve comment. In the first place, the distribution of 2PQ is curvilinear, reaching its peak where $P = Q = .5$, and declining steadily as P moves toward 0 or 1. That is, we find a formal justification for Merton and Kitt's troubled footnote:

... it is scarcely probable that this relationship between actual mobility rates and individual satisfaction with mobility chances holds throughout the entire range of variation. . . . Presumably the relationship is curvilinear, and this requires the sociologist to work out toward the conditions under which the observed linear relation fails to obtain. (MK, n. p. 54)

The second point worth noting is that the Research Branch authors do not use our argument, but one which is, in terms of the theory, invalid. They say that in the Air Force the promoted were less happy and the non-promoted more unhappy than in the Military Police. Then they implicitly assume that the questionnaire item they are considering measures personal happiness and that the sum of happiness is greater in the Military Police. According to the theory, this can not be so, for according to inferences 1 and 2 the proportion

of relatively deprived always equals the proportion relatively gratified. Hence, an increase in one is always accompanied by an increase in the other. If, however, one assumes, as we have done, that the dependent variable is "fairness," not deprivation-gratification, the conclusions of the authors are congruent with the theory and with the data in all instances.

SOME SPECULATIONS ON SUB-GROUP FORMATION

While our theory was designed to codify the examples in *The American Soldier*, as in all formalizations, the scheme is capable of generating a large number of additional hypotheses. In particular, the theory will suggest some aspects of the structure of simple social systems which are not considered in *The American Soldier*, which typically concentrates on sub-group differences rather than characteristics of the system as a whole. While the following is only one of a number of questions which can be treated with the theory, it may serve to illustrate some of its possibilities.

Any population may be partitioned in numerous ways, in terms of education, age, sex, hair color, introversion, etc., etc. In some of these instances, the logical division is also associated with recognized social divisions, as in the case of religious sub-groups or political parties. In other instances, an equally important distinction, e.g., a personality trait, will not produce socially recognized sub-groupings. Our theory suggests some hypotheses about conditions which will produce self-conscious sub-groupings.

To begin with, let us assume, by fiat, that sub-grouping will be most prominent in a social system when: (a) members of the particular sub-group consider themselves to be very different from members of the out-group, and (b) members of the sub-group consider themselves to be very similar to each other. These, of course, correspond to our variables of social distance and in-group fairness.

We can then say that sub-grouping will reach a maximum when: (a) in-group fairness is at a maximum and (b) out-group distance is at a maximum. Now, so far, our new theory is true by definition (i.e., tautological). However, we can begin to edge out on a limb by asking what conditions should produce high sub-group consciousness.

Since all of our variables are inter-related, we can write the expected amount of sub-group consciousness as a function of a number of different variables. Let us consider a simple system in which the partitions consist of deprivation and a single other social category. Now, despite all the words we have used to describe such a system, all the information involved is given by a simple four-fold table in which deprivation is cross-tabulated against the social characteristic of interest. Now, the four numbers in the table can themselves be thought of as functions of the two "marginals" (i.e., the number

of persons in the social categories and the number of persons deprived in the system) and the degree of correlation or association in the table. If we then consider a system in which the numbers of A's and NA's are equal, we can then derive the degree of sub-group consciousness (and any other variable in the theory) as a function of (a) the total level of deprivation in the system and (b) the randomness or correlation in the distribution of deprivation between the two sub-groups.

Given such a system, the expected proportion in the total population who are characterized as "in-group conscious" (i.e., whose comparisons lead them to define themselves as unlike the out-group and like the in-group in terms of deprivation) is as follows:

$$\frac{(P_A^2) \cdot (Q_{NA} + Q_A^2) \cdot (P_{NA} + P_{NA}^2) \cdot (Q_A + Q_{NA}^2) \cdot (P_A)}{2}$$

If we take a simple measure of correlation,² it turns out that what we get may be summarized by the following graph.

The vertical axis indicates the probability that a person drawn at random from the system will be "in-group conscious," while the horizontal axis indicates the degree of correlation. At the left we find the most extreme discrimination against the A's, at the right the most extreme discrimination against the NA's, while point R in the center indicates a purely random distribution. Each deprivation level generates a separate parabola except that the distribution is symmetrical, such that the results for .20 are the same as .80; .30 is the same as .70, and so on. We may draw the following conclusions from this:

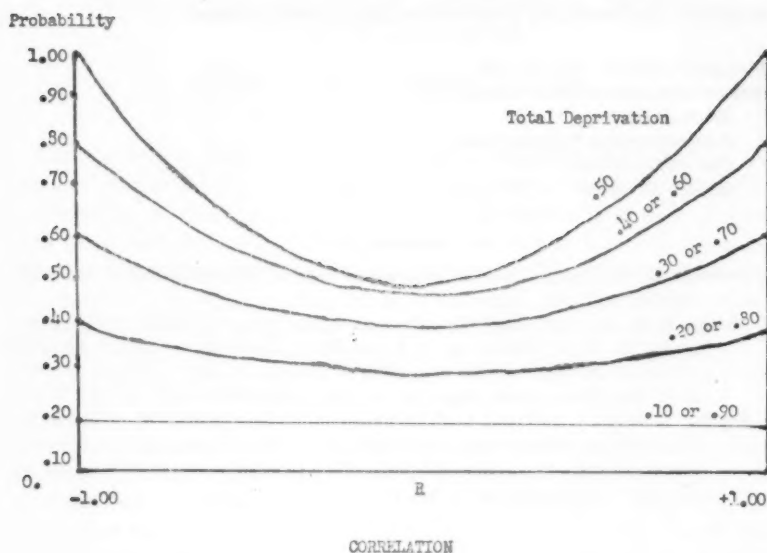
15. Sub-group consciousness increases as the correlation between the social category and deprivation increases, regardless of the total level of deprivation in the system.

16. Sub-group consciousness decreases as total deprivation departs from .50 toward either 0 or 1.00, regardless of the degree of correlation between the social category and deprivation.

In a less formal way we can say that our theory suggests that the way to *create* sub-groups is to start rewarding them differentially and keep the total level of reward in the system near .50; while conversely the way to lower sub-group consciousness is to treat both groups equitably and move the

² It should be noted that the exact results of such an analysis will vary with the writer's definition of "correlation." The one we used was as follows: At each level of total deprivation, we defined an increase in correlation as an increase in the value of P_A . We set the maximum as the maximum for P_A , the minimum as the minimum P_A could reach for that level of total deprivation, and then plotted the intervening points so that equal changes in P_A produced equal changes in "correlation."

CHART 1



reward level to an extreme of either general deprivation or general gratification. They either provide another toy or remove the toy. This, of course, is what parents of small children do when they observe only one toy, simultaneously removing any correlation and pushing the deprivation level toward one or the other extreme. Our inferences thus appear intuitively agreeable, although experimental confirmation would add somewhat to our confidence in the theory.

However, our interest here is not in sub-group consciousness itself, but rather in noting that this is only one of a number of problems which can be analyzed using the theory of relative deprivation. For instance, we could look for the factors underlying differences between the two social categories in the amount of sub-group consciousness; we could predict the occurrence of an anomie-like state defined by the probability that ego will feel different from both the out-group and from the in-group; or we could look at a variable which might predict mobility aspirations between the groups, such as the probability that ego will feel different from his in-group and like the out-group. In short, the theory appears capable of generating a number of hypotheses which have not been discussed in *The American Soldier* or in this essay. Thus, again we note the familiar conclusion that an attempt to attain closure through codifica-

tion usually produces more new questions than it answers. Such, apparently, is the task and inevitable frustration of theory construction.

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Contrasting Disciplinary Preferences for Barnett's Types of Innovation¹

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Sixty years ago Gabriel Tarde developed a theoretical exposition of the nature of innovation (6). His argument was based on a concern with imitation as the dominant historical process. He stressed the continuity of an innovation with the parent forms from which it arose. This approach to innovation received no systematic challenge until the publication of H. G. Barnett's treatise, *Innovation* (2). Barnett, unlike Tarde, gives more attention to the mechanisms which give rise to innovative change than to historical continuity. This paper will examine possible psychological correlations with the processes of innovation which Barnett defines.

Barnett's classification of innovation is based on the concept of configuration. A configuration is a form or construct characterized by its perceived homogeneity with respect to some prepotent feature. A configuration can be analyzed into two elements and the relationship which binds them; the elements and the relationship in turn are configurations on a lower level. The configuration—chopping down a tree—may be analyzed into the elements the axe and the tree. The relationship which binds these elements together is the movement by means of which the axe strikes the tree. The axe, in turn, may be viewed as a configuration and may be broken down into its elements—the blade and the handle—which are bound together by the relationship—being hafted.

Innovation, for Barnett, is a process which happens repeatedly for every individual each day of his life. Any situation in which a configuration adds or changes an element or a relationship is innovation. Thus the invention of a machine and the misreading of a newspaper headline arise from the same process, though the former may be analyzable into a number of innovative acts. The processes of innovation are defined by Barnett on the basis of how the alteration of the configuration occurs.

Each innovation involves two types of configurations: (a) the familiar configuration—the configuration possessed prior to the innovation; and (b) the external configuration—the configuration which stimulates the onset of the innovation. If the familiar configuration retains one element, and the other

¹ The author is indebted to the following members of the University of Chicago faculty: Fred L. Strodbeck for assistance with every phase of this research; Sudhish G. Ghurye for assistance with the statistical analysis; and Sheldon White for assistance with the development of the procedures.

element and the relationship are supplied from an external configuration, then Barnett would say that an element from the familiar configuration was *projected* into the context of the external configuration. About ten years ago, women in some parts of the United States began wearing men's ties on their shirts. In this innovation an element, the feminine shirt, was projected into the external configuration of a man's necktie worn on a man's shirt, the latter being replaced by the projected element, the woman's shirt.

If the familiar configuration retains its elements and acquires a relationship from the external configuration, or if it retains its relationship and acquires new elements from the external configuration, then the innovation is referred to by Barnett as an analogy. The Christmas carol, *What Child Is This*, is an analogy to the external context, *Greensleeves*, for the elements or words of the carol are placed in the relationship of melody derived from the folk song.

If the familiar configuration is retained except for the substitution of an element taken from an external configuration, then Barnett would say that this new element was *assimilated* into the context of the familiar configuration. Devout members of the Indian Shaker Religion adopted the "prayer table," formerly used only in the church, into the religious services performed in the home. In this innovation, a single element from the external context of the church, the prayer table, was assimilated into the familiar context—religious services held in the home (2).

Every individual makes use of all of these kinds of innovation in daily living. Barnett suggests, however, that the members of a particular culture may favor one kind of innovation. He cites the Zuni and the Yapese as primarily assimilative and the Navajo and the Palauans as primarily projective (2). Contemporary American culture is characterized by considerable heterogeneity, based on extensive specialization. It is very likely that individual differences in preferences for types of innovation arise within this complex culture. I would like to explore the possibility of constructing tests which might diagnose such individual preferences for these three kinds of innovation. Let us examine kinds of behaviors which could be tested and which appear to correspond to Barnett's types of innovation.

The projective act involves the adoption of the context of an external configuration. Consequently, a person who favors projection responds readily to external contexts. This requires the perception of details in the external configurations which confront him. Since an unfamiliar situation like a test represents an external configuration, we could expect that such a person would evidence a concern for *detail*.

Innovation achieved by analogy involves the separation of *relationships* from *elements*, and the development of new configurations by the transferring of relationships. An individual stressing this process must be capable of analyz-

ing the relationship out of a configuration. Consequently, such an individual is aware of the relationships in the configurations which confront him. We could expect this individual, when faced with an external configuration like a test, to evidence a concern for *relationships*.

The assimilative act involves the incorporation of a single element into the context of a familiar configuration. A person stressing this type of innovation emphasizes the context of familiar configurations. We should expect that such an individual, when faced with an external configuration such as a test, would evidence a concern with *self*.

Let us now consider groups in contemporary American society which have cultural characteristics that would cause us to expect them to show these three kinds of emphases. Aristotle presents a tripartite classification of the kinds of activities in which specialists engage. In *Ethics*, Book VI, Aristotle (1) describes these three categories of activities as follows: "Practical wisdom, then, must be a reasoned and true state of capacity to act with regard to human goods." The basis of this wisdom is deliberation and judgment concerning the state of variable elements, and the ability of men to "see what is good for themselves and what is good for men in general." "Scientific knowledge is, then, a state of capacity to demonstrate the nature of the necessary and eternal, by syllogism or by induction." "Art is identical with a state of capacity to make, involving a true course of reason. All art is concerned with coming into being, i.e., with contriving and considering how something may come into being which is capable of either being or not being, and whose origin is in the maker and not in the thing made."

For the purposes of this discussion I would like to interpret Aristotle's presentation of these categories as follows: Policy making is primarily concerned with correctly evaluating the particulars of the environment in terms of what is good for society. A policy maker, such as a lawyer, brings into each configuration or case the element of legal precedent, which is believed to reflect the socially desirable; this element is projected into the case and a new configuration, the brief, is created. Thus the lawyer by the nature of his task is required to stress the process of projection. Science is primarily concerned with making demonstrations of the laws governing events and states. These laws are relationships which the scientist learns to shift among sets of elements. The task of a scientist, such as a physicist, is to develop new configurations through the transfer of scientific principles or relationships. Thus a physicist is required to stress the process of analogy. Art is primarily concerned with the creation of objects, the form of these objects arising primarily out of the creator. An artist therefore is engaged in introducing the preconceived form into his chosen medium. The new configuration arises when the familiar configuration of form has assimilated the element of

medium. Thus an artist by the nature of his task is required to stress the process of assimilation.

In summary (see Table 1) we see that Barnett's categories of innovation are possibly correlated with certain kinds of behavior which are accessible to psychological testing. Further, we see that certain disciplines—law, physics, and the humanities—do possibly emphasize particular types of innovation. If these two sets of assumptions obtain, then we would expect the three groups to be discriminated by psychological tests as follows: (a) law—concern with detail; (b) physics—concern with relationships; and (c) humanities—concern with self. It is these contingencies which this study will attempt to demonstrate.

TABLE 1
Correlated with Barnett's Categories of Innovation

Barnett's Categories of Innovation	Aristotle	Contemporary Disciplines	Behaviors to be tested
Projection	Practical Wisdom	Law	Concern with Detail
Analogy	Scientific Knowledge	Physics	Concern with Relationships
Assimilation	Art	Humanities	Concern with Self

PROCEDURES AND RESULTS

Sample

The sample consisted of three groups of 20 University of Chicago male graduate students—physics students, law students, and humanities students (from the Art, Music, and English departments). These students were random sampled from departmental lists, except for the Art and Music lists from which all persons were contacted. Only students who gave a United States home address in the student directory were contacted, for the native language of the subject might interact with the word association test. Each of these sixty persons was tested in a single session, varying from 45 to 75 minutes. The testing was performed in either of two rooms; a similar proportion of each group was tested in each room. The three tests were given to each subject in the order presented below.

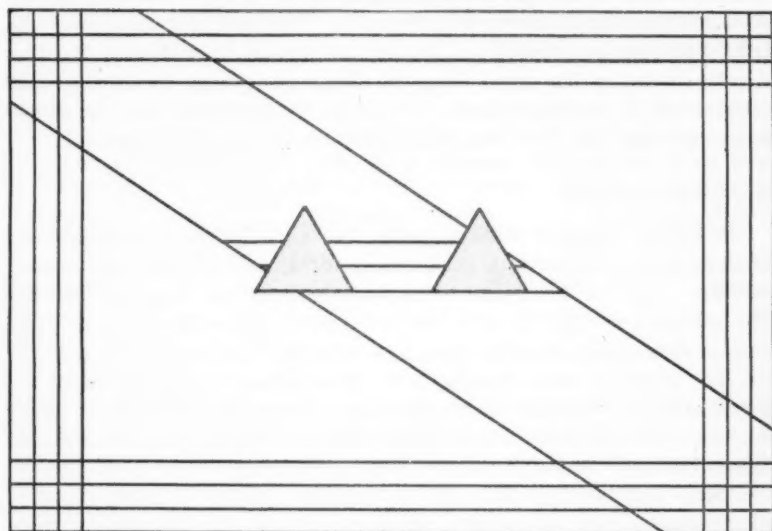
Card Sorting Test

The first test offered two alternative strategies to the subject: he could solve the problem by paying attention to detail or to relationships. In a period of five minutes the subject was asked to select nine cards from a set of twenty-four, displayed before him, and to arrange them on a 3 x 3 matrix. These cards

were constructed from eight qualities, each of which takes three values (see figure 1).² The values of these eight qualities were randomly assorted with no restriction on combinations or repetitions.³ The subject was asked to create as many relationships as possible in five minutes. When the five minutes were up, the subject was asked to describe those relationships which he intentionally built into his arrangement. Two indices were mechanically computed:

FIGURE 1

Card Sorting Test; A Sample Card



(a) the detail index, which is the total number of qualities which the subject had incorporated into more than one relationship or into one relationship having five or more cards, and (b) the relationship index, which is the total

² The eight qualities and their three values are as follows: (a) the color of the card—blue, pink, or yellow; (b) the color of the figure(s)—red, green, or blue; (c) the color of the lines—green, brown, or purple; (d) the shape of the figure(s)—square, circle, or triangle; (e) the number of figures—1, 2, or 3; (f) the number of borders—1, 2, or 3; (g) the direction of the stripe—horizontal, vertical, or diagonal; and (h) the direction of the three parallel lines within the stripe—horizontal, vertical, or diagonal.

³ A description of these 24 cards, and tables containing all of the results, have been deposited as Document number 5996 with the ADI Auxiliary Publications Project, Photoduplication Service, Library of Congress, Washington 25, D. C. A copy may be secured by citing the Document number and by remitting \$1.25 for photoprints, or \$1.25 for 35 mm. microfilm. Advance payment is required. Make checks or money orders payable to: Chief, Photoduplication Service, Library of Congress.

number of kinds of geometrical relationships which the subject used and which are different from six previously determined most common kinds—horizontal, vertical, and diagonal rows of two and three cards.

This test was designed to discriminate between the law and the physics students. The detail index was expected to indicate a concern with detail, and the law students were expected to choose this alternative. The result, as tested by the single tailed t-test, was significant in the direction predicted (an alpha error of .05 has been used in all tests of significance). The relationship index was expected to indicate a concern with relationships, and the physics students were expected to choose this alternative. The result as tested by a single tailed t-test was not significant. The product moment correlation of the relationship index on the detail index for these two groups was well within symmetrical .05 confidence limits for r , under the hypothesis that rho equals zero, suggesting that these two indices are uncorrelated and independent.

Word Association Test

The subject was read a list of twelve words in this order: order, *dream*, longing, *square*, *memory*, animal, model, *dark*, *deep*, *bread*, understand, *working*—words in italics were taken from the Kent and Rosanoff lists (3). The subject was asked to give five responses to each stimulus word. The number of responses actually given to a stimulus word varied from zero to six. The responses were classified into three different categories based on Woodworth (7): logically close—including coordinate, subordinate, clang responses, and all other logical associations not included in the logically distant category; logically distant—including contrasting and superordinate responses; and personal—including not logically related responses, e.g. personal responses and non-factual evaluations. All responses given in the Kent and Rosanoff tables to the seven words obtained from their list, and all the responses given in testing eleven subjects in a pilot study, were classified first by myself and then by a colleague whose judgment was accepted as final in the few cases of disagreement. This list of evaluated responses was assembled prior to testing and all the responses given by the subjects of the main experiment which occurred on this list were mechanically evaluated. The remaining responses were evaluated blind by the colleague with no assistance from the author or knowledge of his hypotheses.

It was predicted that this test would demonstrate all three of the types of behavior being studied. The three categories were expected to be associated with the three concerns as follows: logically close—concern with detail; logically distant—concern with relationships; and personal—concern with self. In order to test this hypothesis the percentage of words given by each subject in each category was computed. These percentages were summed

into an index for each subject after receiving the following weights: logically close—zero; logically distant—positive one; and personal—negative one. For example, a subject who gave 77 per cent logically close, 18 per cent logically distant, and 5 per cent personal would have an index of 13 (18 minus 5 equals 13). In terms of this index, the predictions could be expressed as follows: law—medium index; physics—high index; and humanities—low index. The groups did order in this fashion and the intergroup differences appeared significant on an F test. The q statistic (5) indicated that the mean index of the physics students differed significantly from the other groups, but that the law and humanities students' mean indices were not significantly different. Table 2 gives the means for the percentages and the mean index for the three groups.

TABLE 2

Means of the Percentage Scores of the Word Association Categories and of the Index

Group	Categories of Responses			Composite Index
	Logically Close (wt. 0)	Logically Distant (wt. 1)	Personal (wt. -1)	
Humanities	68.3	9.3	22.2	-12.86
Physics	75.2	12.9	11.8	1.08
Law	69.4	10.9	20.5	-9.63

The large number of logically close responses given by the physics students, as compared with the law students, suggests the possibility either that the physics students had evidenced a concern with detail or that the logically close category was not a measure of detail. The detail index of the card sorting test appeared to be an estimate of a concern with detail; therefore, the product moment correlation of this index on the logically close category was computed. The value of r was well within symmetrical .05 confidence limits under the hypothesis that ρ equals zero. There is reason to believe that these indices measure two different phenomena. Perhaps the distinction between contrasting and superordinate responses and other kinds of logically related responses is of minor importance, and both the logically close and the logically distant categories are measures of a concern with relationships.

Lever Test

This is an operant conditioning type experiment (4). The subject was told that pressing a lever could release pennies from a box and he was asked to get as many pennies as possible. In this design the pressing of the lever is the operant or response which is being conditioned, and the release of pennies is the reinforcement upon which this conditioning depends. The subject

did not keep the pennies that were released. The first minute was a series of fixed ratios: five reinforcements each at a 1:2, 1:3, and 1:5 fixed ratio schedule and the remainder of the minute at a 1:10 fixed ratio schedule. The second and seventh minutes were a fixed interval schedule with a reinforcement on the first response in every five-second interval. Minutes three and four were a random interval schedule consisting of 5, $7\frac{1}{2}$, and 10 second intervals. Minutes five and six were extinction. Minute eight was a 1:10 fixed ratio. The lever presses were recorded as blips on a tape.

It was predicted that the physics and law students would be task oriented and vary their rate of performance with the changing schedules. It was predicted that the humanities students would be self oriented, and would show little variation in their response rate, even though aware of the schedule changes. It may be noted that a subject who did avoid becoming involved would also avoid the annoyance provided by the long extinction period. This strategy, therefore, would receive reinforcement other than the penny incentive which motivated the individuals who varied their response rate.

The variance of the number of lever presses in each five-second interval was computed for each subject. Since this variance was partly a reflection of the overall rate of pressing, the coefficient of variation was used as a measure of the variability of the performance. This index, s/\bar{x} , corrects for the effect of the mean rate of pressing. A single tailed t-test confirmed our expectation that the humanities students were significantly lower on this index of variation than the other two groups.

SUMMARY AND DISCUSSION

Barnett has developed a tripartite classification of innovation. We expect individual variation in preferences for the different types of innovation. The author proposes to explore the possibility of creating psychological tests which will detect emphases on each of the three types of innovation. The three types of innovation are plausibly related to three kinds of behavior which are accessible to psychological testing as follows: projection—concern with detail; analogy—concern with relationships; and assimilation—concern with self.

We derive, through an argument grounded on Aristotle's classification of activity, the possibility that three contemporary disciplines are likely to emphasize types of innovation as follows: law—projection; physics—analogy; and humanities—assimilation.

A sample consisting of 20 graduate students in each of these three fields was drawn and given three tests: a card sorting test, a word association test, and a lever pressing test in that order. These tests were expected to provide frameworks upon which individuals could express their emphases in problem

solving. It was hypothesized: (a) that a concern with detail and a concern with relationships would be detected on the card sorting test; (b) that a concern with self would be detected on the lever pressing test; and (c) that all three concerns would be detected on the word association test. The results have shown that the tests were not capable of providing a framework upon which several approaches to problem solving could be demonstrated. Instead, each test seemed to favor one or another of the problem solving alternatives being studied. The card sorting test seemed to favor the emphasis of detail—hence, it was on this test that the law students were distinguished. The word association test seemed to favor the emphasis of relationships—hence, it was on this test that the physics students were distinguished. The lever pressing test seemed to favor the emphasis of self—hence, it was on this test that the humanities students were distinguished.

The results indicate that these problems select for a particular single emphasis and tend to suppress alternative emphases. This discovery is quite consistent with the original formulation of the research in which we associated kinds of innovation with disciplines on the basis of the demands made by the problems peculiar to these disciplines.

The results suggest that it may be possible to assess preferences for Barnett's types of innovation with psychological tests such as these. We cannot be certain that the indices computed from these tests are related to preferences for types of innovation. This caution is based primarily on the two unproved assumptions in the argument which generated this study. We can not be certain that the three kinds of behaviors studied—(a) a concern with detail, (b) a concern with relationships, and (c) a concern with self are correlated with preferences for types of innovation. This is a question of fact and cannot be satisfactorily proved without appropriate experimentation. Similarly, the question of whether these disciplines do emphasize the types of innovation which is assumed for them is also an unanswered question of fact which awaits empirical demonstration. The only basis on which I can claim that these tests measure preferences for types of innovation is that the successful predictions depended upon both of the above assumptions. This double set of contingencies makes it more difficult to explain the results by an alternative hypothesis.

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Reference Group Processes in a Formal Organization¹

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There seems to be ample evidence now that a person's attraction to membership in a group or organization is one of the major determinants of his behavior (1, 8, 9, 10, 15, 19, 24, 25). What the sources of attraction are for different types of persons and groups, what processes mediate attraction to a single or competing groups, under what conditions these processes occur—these and many related questions within the general theory of reference group behavior (20) are still relatively unanswered by precise empirical determination. This paper reports research directed toward increasing understanding of some of these reference group processes.

The investigation began with a number of commonly held and overly simple assumptions about the nature of persons and groups. First, it seemed safe to assume that a person in his relations with others is constantly attempting to maximize his personal gratification and to minimize his deprivation. Since personality was not a focus of the study, the important question of which needs would be satisfied in what type of interpersonal relations was not specified. It was simply assumed that all persons to some degree seek approval rather than disapproval in their social relations.

Second, it was assumed that all groups and organizations generate an informal prestige system in addition to their formal status and authority structure. Although there is controversy as to whether or not such stratification processes in a social system are functional or dysfunctional (5, 6, 28, 29), there seems to be general agreement that they do occur. The allocation of prestige to members of a system is determined to a considerable degree on the basis of compliance with its shared standards and contribution to its explicit purposes (2, 18). Although there are many ways in which valuing or devaluing of a member can be expressed formally, much of the allocation and transmission of prestige symbols in groups and organizations occurs via person-to-person interaction. The cues made available are often extremely subtle, especially when disapproval is involved; but most persons develop highly

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sensitive if not always reliable antennae for sensing slight indications of approval or disapproval in others' behavior toward themselves.

It was assumed, too, that the prestige symbols or indications of social approval and disapproval sensed by a person in his relations with others were directly related to the magnitude of his personal gratification or deprivation. His ego needs would be satisfied or denied to the degree that he perceived others valuing or de-valuing him in his role as a member of the system (18).

A hypothesis that follows readily from these assumptions is that *the more highly valued a person perceives himself to be by others in his group, the greater will be his attraction to that group*. This generalization was tested with questionnaire data obtained from two groups of boys and two groups of girls who had been together for several years as members of homerooms in a high school.

The results, although too inconclusive to be reported here in detail, did have an effect upon the subsequent direction of the research. No relationship was found between a subject's *perception of being valued* and his attraction to the group. In one group, however, there was a significant positive relationship between *actually being valued* by the other members and the degree of attraction to the group. Analysis of the distribution of ratings and interviews with the teachers of these groups suggested that the existence of highly valued cliques and consequent barriers to communication might be a factor contributing to the findings. Members of cliques, although highly valued, had relatively low attraction to the group as a whole. In the presence of restraints against communication, a person's perception of others' evaluations would be less accurate since less affected by the receipt of interpersonal prestige symbols. In reporting how much he was valued by others, a person also apparently felt systematic tendencies to distort: downward tendencies arising from modesty or cultural pressure if he was in fact highly valued; and marked defensive tendencies to overestimate if he was accorded low social worth by his peers.

The results of the exploratory research led to a formulation of the original hypothesis in less phenomenological terms. A person's perception of how much he is valued by others might be too responsive to distorting forces arising either from personality needs, cultural demands, his position in the social structure, or the measurement situation itself. His attraction toward one group or another might be a response to a multitude of subtle cues implicit in interaction with others without any necessary awareness on his part that the totality of cues signified that *he was valued*. Thus so long as a person has sufficient interaction with a group of others in the context of activity directed toward the achievement of group objectives or the maintenance of group integrity, his attraction should be proportional to his *social worth*, i.e. how much he is

objectively valued by others, irrespective of whether or not he accurately perceives their evaluation of him.

In a complex social system that is differentiated into functional subgroups, such as a community or a social organization, a person interacts with members of other groups as well as of his own. His activities have repercussions beyond the boundaries of the group to which he formally belongs. Thus processes of evaluating the contribution of members to the objectives and maintenance of the larger system occur throughout the system. The social worth accorded a person by members of his own group may or may not correspond to that given him by members of other groups in the organization. Assuming that the person is sensing evaluative cues in his interaction with members of many different groups in the organization, he should be most attracted to the group where his social worth is highest and least attracted to belonging to the group where he is least valued.

The above thinking can be summarized in the following hypotheses which were tested in the research reported in the balance of this paper.

1. *In any group or organization a person's attraction to membership will be directly related to the magnitude of his social worth.*

2. *The magnitude of the positive relationship hypothesized in (1) will vary directly with the volume of interaction the person has with other members of the group or organization under consideration.*

3. *Where alternative group orientations are possible for a person, his relative attraction to membership in one or another group will be directly related to his relative social worth in the groups considered.*

4. *The magnitude of the positive relationship hypothesized in (3) will vary directly with the volume of interaction the person has with other members of the groups under consideration.*

METHOD

Population

The research utilized as subjects the 72 staff members of a child welfare agency in a midwestern state. The "Midwest Social Agency" was selected for the study because it met with criteria of size, convenience, and the demands of the theoretical problem. The entire staff participated in the study, with the exception of a psychologist and a psychiatrist.² There were 64 women and 8 men ranging in age from 21 to 63 with the mean age approximately 40. Each person occupied a position with a formal status designated by civil service. These positions were on two different status scales, one of five strata for

² Owing to absences and incomplete responses, data were available for the analysis reported here from only 63 members of the staff.

professional workers and one of seven strata for non-professionals. There were 46 professionals and 26 non-professionals in the sample. The professionals were almost all social workers with the exception of a nurse and a business executive. The non-professionals had more varied occupations: stenographers, typists, bookkeepers, housemothers, recreation workers, cooks, a stores clerk, and a janitor. In duration of employment with the agency the subjects ranged from 25 years to two months with mean length of service slightly over five years. About half of the subjects were married.

Research Plan

To test the hypotheses stated above a situation was required in which individuals were members of subgroups as well as members of a larger organization. The first step in the research, reported in detail elsewhere (13, 16), was to determine each person's actual work group affiliation. A questionnaire was administered to the total staff, in which each member was asked to list the groups to which he belonged, the purpose or function of these groups, and the other persons who also belonged to them. Analysis of these data led to the location of each person in one of six work groups. The resultant work group structure corresponded closely to that shown on the formal organization chart, but resolved a number of ambiguities therein.

One month after the administration of the initial questionnaire subjects filled out the Personal Contact Checklist, described below. A copy of this instrument was mailed to each staff member at his home and mailed directly back to the investigator.

A month later a final mailed questionnaire was used to obtain data about each subject's *social worth* and his *attraction* to both his work group and to the total organization.

Frequency of Contact

The Personal Contact Checklist, a sociometric-type questionnaire, was used to obtain measures of the frequency of interpersonal contact in the organization. This instrument was adapted from one used by Jacobson and his colleagues (17). It is also similar to procedures reported by Stogdill (26) and is a development of ideas originally suggested by Moreno, Jennings, and Sargent (21).

Each subject was given an alphabetical list of the entire staff of the Midwest Social Agency. Opposite each name he had to indicate the frequency, nature, and importance to him of his contacts with that person. Frequency was checked on a five-place scale. Responses were given a numerical weighting to obtain frequency of contact, as follows: *Several Times Daily* = 100; *Daily* = 50; *Two or Three Times Weekly* = 25; *Several Times Monthly* = 5; *Several*

Times Yearly = 1. It was then possible to rank the respondents according to the total frequency of contact which other members reported *having with them*. This was considered to be a more reliable and valid measure than the amount of contact an individual reports having with others since it is based on a large number of individual reports. The total sample was split at the median frequency of contact score to obtain *high contact* and *low contact* groups.

Measures of Social Worth

A measure was obtained of how much each person valued every other person on the staff, both in the context of his organizational membership and of his work group membership. In addition each person was asked to report how much he thought every other person valued him in each of these contexts. The questionnaire consisted of a list of persons from whom the selection was to be made and instructions as to the criterion of choice. The following instructions were used for the total organization sociometry:

When answering the following questions, please think of the staff of the entire Agency, not just your own department. In the Midwest Social Agency it is likely that some people make a greater contribution than others to what you think of as the organization's goals. These people may or may not be the ones with the highest positions. If, however, you think that they make the greatest contribution to the organization's goals, they are the ones whose absence would be felt most. In this sense, they are the *most valuable*.

Subjects were then asked to select the ten persons they considered most valuable from a list of the entire staff. After a respondent had completed this task and had answered a number of other items in the questionnaire, he was asked to predict who would choose him on the above sociometry by checking the name of "each person who you think will select you."

The entire procedure was repeated later in the questionnaire in the context of the respondent's work group membership instead of his organizational membership. Only the names of the respondent's work group were listed on this item. The number of persons chosen varied with the size of the subgroup, being approximately 30 per cent of the N of the group. The different probabilities of being chosen were taken into consideration in the analysis.

Scales for Measuring Attraction

Attraction to the organization and to a person's work group were measured by two different scales: one to measure attraction to the people in a group, and the other to measure the amount of benefit the respondent felt he was receiving by belonging to the group. These two scales were called *Attraction-People* and *Attraction-Benefit*. They correspond to two of the "sources" of attraction which Back used in his laboratory experiment: "Personal Attraction" and "Task Direction" (1).

The scales were developed in a series of pretests using a modification of the Method of Paired Comparisons (12) which Coombs in his theory of data categorizes as "Order 3, Task B" (3). The steps in the construction of these scales and the items themselves are described elsewhere (13).

A problem arose in employing the attraction scales in the Midwest Social Agency. The agency clearly was an attractive place for most of the staff members. There was a danger, therefore, that the attraction scores would all pile up on the high end of the scale. Yet there was a limit to the number of positive-sounding statements that could be discriminable steps on a scale. The difficulty was handled by using a method of presenting the scales which corresponds to Coombs's "Order 2, Task A" (3). The subject is asked to order two statements with respect to their closeness to his "ideal" position on the scale. As long as the data, by falling into a certain pattern, support the assumption that an underlying attribute exists, the number of score categories is increased with this method from n , if the subject had been asked to indicate the one statement with which he agreed most, to $2(n-1)$, where n equals the number of statements on the scale.

There were seven statements in the Attraction-People scale and six in the Attraction-Benefit scale. Analysis of the data obtained in the Midwest Social Agency supported the assumption that they were true scales. For five presentations to 63 subjects, only four out of 315 responses were non-scale responses.

RESULTS

Hypotheses were tested by computing Pearson product-moment correlations between measures of attraction and social worth. Since data had been obtained in both total organization and work group contexts, it was necessary to use the appropriate scale and sociometric scores when computing a correlation. The measure used for social worth in a work group context was the number of choices the person received divided by the number he would have received by chance if all choices made had been distributed equally among members of the group.

In Table 1 it is seen that the first hypothesis is supported when Attraction-Benefit is the measure used, but not with Attraction-People. The initial theorizing simply assumed that a person would obtain gratification from interacting with others who valued him. It did not specify the nature of the interpersonal rewards nor distinguish between different sources of attraction.³ These results suggest, if the theory is correct, that the interpersonal rewards

³ The most positive statement on the Attraction-Benefit scale was "I feel I am receiving a tremendous amount of benefit by working there." On the Attraction-People scale the most positive statement was "I look forward with enthusiasm to the pleasure of working with them."

TABLE 1
Relationship between Attraction and Social Worth

Variables and Context	r	p*	N
<i>Attraction-People and Social Worth</i>			
Total Organization	.16	.21	63
Work Groups	.16	.21	63
<i>Attraction-Benefit and Social Worth</i>			
Total Organization	.28	.02	63
Work Groups	.31	.01	63

* Two-tail tests are used throughout this paper since the initial hypotheses were in general form and did not specify the context, source of attraction, nor subpopulation for which predictions would be true.

received by highly valued persons consist to a considerable degree of tangible or intangible benefits they feel they are receiving because of their membership in their work group or the organization.

What a member of the Midwest Social Agency might perceive as a benefit could vary a great deal, ranging from his salary to his perceived professional development in that organization or a subgroup. It would differ for persons depending upon their characteristic motivations or life goals. One would expect it to differ considerably for professional and non-professional workers. In Table 2 it is clear that a relationship between attraction and social worth exists only for professional workers. For non-professionals the relationships are not significant using either measure of attraction in both organization and work group contexts.

These findings partially support the first hypothesis, but they impose restrictions upon its generality. It seems to be true only for a particular category of persons, what might be seen as the superior stratum in a caste system; and it applies only when particular gratifications are being received, those

TABLE 2
Relationship between Attraction and Social Worth for Professional and Non-Professional Workers

Variables and Context	Professionals (N = 45)		Non-Professionals (N = 18)	
	r	p	r	p
<i>Attraction-People and Social Worth</i>				
Total Organization	.18	.24	.08	.74
Work Groups	.19	.21	.04	.87
<i>Attraction-Benefit and Social Worth</i>				
Total Organization	.30	.04	.16	.53
Work Groups	.37	.01	.11	.67

relevant to the motivations of that category of persons. The benefits perceived to be available in the Midwest Social Agency, as in any organization with professional objectives, are accessible only to members of the professional caste or at least have valence only for them. These benefits might include participation in policy decisions, consultation on cases, interesting and informative discussions, and other types of experience. If these gratifications were not available, the professional worker could easily turn toward some other group or organization.

The rewards available to the non-professional in the organization appear to be of a different order. Non-professionals do not work *with* the others in the system but *for* them. They make indirect rather than direct contributions

TABLE 3
Relationship between Attraction and Social Worth for Persons with High and Low Interpersonal Contact

Variables and Context	Frequency of Contact			
	High (N = 31)		Low (N = 32)	
	r	p	r	p
<i>Attraction-People and Social Worth</i>				
Total Organization	.25	.18	.06	.74
Work Groups	.37	.04	.04	.83
<i>Attraction-Benefit and Social Worth</i>				
Total Organization	.43	.02	.02	.90
Work Groups	.50	.004	.17	.35

to the goals and maintenance of the system. Upward mobility is not possible because of caste barriers. It is likely that the benefits they receive are a function of their remaining members of the organization rather than being prestige symbols mediated by person-to-person interaction.

Findings relevant to the second hypothesis, that the relationship between attraction and social worth is a positive function of the amount of interaction, are presented in Table 3. The hypothesis is clearly supported by these relationships. For those with high contact, three of the four correlations are significant at an acceptable level; for those with low contact, none of the correlations approach significance. Differences between correlations for those with high and low contact, using the Attraction-Benefit scale, reach the .10 level in the total organization context and the .15 level in the work group context. Although not significant, they are consistent with the initial theorizing.

Controlling on the amount of interpersonal contact also brings to light a significant relationship between Attraction-People and social worth in a work

group context for those with high contact. The findings with this scale parallel those found with Attraction-Benefit but are weaker. Since the two scales are correlated .47 in the total organization context and .61 in the work group context, it would appear that the gratification of working with others in the Midwest Social Agency represents part of the total sum of benefits obtained and contributes to over-all attraction to the work group and the organization, at least for professional workers.

In Table 4 the relationships between the two major variables controlled by frequency of contact are presented for professional workers only. Those for non-professionals have been omitted, being uniformly small and non-sig-

TABLE 4
Relationship between Attraction and Social Worth for Professionals with High and Low Interpersonal Contact

Variables and Context	Frequency of Contact			
	High (N = 22)		Low (N = 23)	
	r	p	r	p
<i>Attraction-People and Social Worth</i>				
Total Organization	.29	.19	.01	.97
Work Groups	.43	.04	-.09	.69
<i>Attraction-Benefit and Social Worth</i>				
Total Organization	.55	.006	.15	.49
Work Groups	.66	.001	.15	.49

nificant. A comparison of these results with those in Table 3 shows considerable similarity. The correlations for those with high contact are uniformly higher than for the total sample when data from only professional workers are used, with significance levels essentially the same. Differences between correlations yield probabilities of .10 for the Attraction-People scale in a work group context, and, for the Attraction-Benefit scale, .10 and .05 in the total organization and work group contexts respectively. The second hypothesis, like the first, is supported for professional workers but not for non-professionals.

The findings presented thus far suggest that the postulated reference group processes are more intensive within a work group context than in the organization at large. This conclusion is supported by the consistency of the magnitude of correlations already presented, seen in Table 5. In seven out of eight comparisons the relationship between attraction and social worth is higher in a work group context than in the total organization; in the eighth case they are equal. In all eight comparisons the relationship is higher with the Attraction-Benefit scale than with the Attraction-People scale when the context

is held constant, pointing to the relative strength of these two sources of attraction for professional workers.

The third hypothesis stated that, where alternative group orientations are possible for a person, his relative attraction to membership in one group or another would be directly related to his relative social worth in these groups. It was tested by correlating a person's attraction to his work group with a measure of *relative social worth*, i.e. how much he was valued by the members of his work group relative to how much he was valued by members of all the other work groups in the organization. The specific operation was the proportion of choices received from his own work group minus the proportion of

TABLE 5
Consistency of Findings Presented in Support of First Two Hypotheses

Variables	Context	Correlations With Social Worth			
		Total Population (N = 63)	Professionals Only (N = 45)	High Com- munication (N = 31)	Profess. High Commun. (N = 22)
Attraction-People	Total Organization	.16	.18	.25	.29
Attraction-People	Work Groups	.16	.19	.37	.43
Attraction-Benefit	Total Organization	.28	.30	.43	.55
Attraction-Benefit	Work Groups	.31	.37	.50	.66

choices received from members of all other work groups, plus 100 to make all the scores positive. It was assumed that the attraction measures were already relative, since any attraction to membership in other work groups in the organization would make a person's own work group less attractive. This assumption is consistent with Festinger's definition of attraction as "the resultant force to remain in the group (10)."

The correlations relevant to this hypothesis are seen in Table 6 to be positive for both attraction scales, although they do not attain an acceptable level of significance. If the hypothesis is correct, two different factors could be acting to decrease the size of these correlations. First, the operation used to measure relative social worth was essentially crude. It makes an assumption which is probably incorrect, that the force of attraction induced by being valued in a person's work group is equal, *per unit of being valued*, to the force induced by being valued outside his work group. It is likely, however, that the actual relative strength of opposing forces varies from individual to individual depending upon specific conditions.

It is also likely that the heterogeneity of the population was obscuring some of the true relationship, since the first two hypotheses were supported only for professional persons in the organization. In view of the commonly asserted

TABLE 6
Relationship between Attraction and Relative Social Worth

Variables	Context	r	p	N
<i>Attraction-People and Relative Social Worth</i>	Work Groups			
	Work Groups (relative to rest of the organization)	.22	.08	63
<i>Attraction-Benefit and Relative Social Worth</i>	Work Groups			
	Work Groups (relative to rest of the organization)	.20	.12	63

marginality of a supervisor's role (23, 31), it also seemed important to investigate possible differences between supervisory and non-supervisory personnel. The correlations in Table 6 were recomputed, therefore, omitting from the sample seven persons who were responsible for active supervision; these correlations were found to be .24 for Attraction-People and .36 for Attraction-Benefit, significant at the .07 and .006 levels respectively. In Table 7 correlations between the same variables are presented for non-supervisory personnel, both professional and non-professional. The results here support the generalization that a person's attraction to his own group is directly re-

TABLE 7
Relationship between Attraction and Relative Social Worth for Professional and Non-Professional Non-Supervisory Persons

Variables	Context	Professionals (N = 38)		Non-Professionals (N = 18)	
		r	p	r	p
<i>Attraction-People and Relative Social Worth</i>	Work Groups				
	Work Groups (relative to rest of the organization)	.30	.07	.07	.78
<i>Attraction-Benefit and Relative Social Worth</i>	Work Groups				
	Work Groups (relative to rest of the organization)	.35	.03	.32	.19

lated to his being more highly valued by its members than he is by members of other groups; with the qualification, however, that this may apply only to professional, non-supervisory personnel. An attempt will be made to understand this restriction in the light of reference group processes after the results which test the fourth hypothesis have been presented. The latter are summarized in Table 8, where professional, non-supervisory respondents are categorized according to their frequency of interpersonal contact. Using the Attraction-People scale, the difference between correlations is significant at less

TABLE 8
Relationship between Attraction and Relative Social Worth for Professional Non-Supervisory Persons with High and Low Contact

Variables	Context	Frequency of Contact *			
		High (N = 15)		Low (N = 23)	
		r	p	r	p
<i>Attraction-People and Relative Social Worth</i>	Work Groups				
	Work Groups (relative to rest of the organization)	.61	.01	-.16	.48
<i>Attraction-Benefit and Relative Social Worth</i>	Work Groups				
	Work Groups (relative to rest of the organization)	.51	.05	.16	.48

* The unequal N's in this table are accounted for by the fact that the seven supervisors omitted from the analysis all fell in the high contact category.

than the .01 level of confidence. With the Attraction-Benefit scale, the difference does not reach an acceptable level of significance. Considering the magnitude of the differences, the size of the groups involved, and the over-all consistency of the findings with the predictions, however, it appears that the null hypothesis can be rejected without too much risk. Thus the evidence provides support for the hypothesis that the relationship between attraction and social worth considered in the context of multiple group orientations is directly affected by the frequency of interpersonal contact among persons in a social system.

The hypotheses dealing with multiple group orientations did not appear to be true for persons in supervisory positions, however, a finding that demands some consideration. The initial generalizations were derived from assuming

that the activities of persons in a complex social system are continuously evaluated by others throughout the system, and that the persons will be attracted toward or away from membership in alternative subgroups in a pattern corresponding to the distribution of gratifications they receive by interacting with others. A supervisor is in a special situation, however, since he belongs both to his work group and to another group which may be termed "management," composed of all persons in supervisory or administrative positions. He interacts frequently with the other members of the latter group and participates in its prestige system. It is likely that it becomes his primary reference group in the organization and that he is especially sensitive to the evaluative cues he senses in interaction with members of this group. If a supervisor is highly valued throughout the organization for the contribution he makes, it is in his role as a member of management. Do the attendant gratifications he receives induce forces upon him to leave his work group and move to a different position in the organization? On the contrary, it is likely that he will perceive these rewards as directly dependent upon his position as supervisor of his work group and that, the greater his social worth outside of this group, the more attractive this position will be to him. Thus a supervisor's attraction to his group work may depend more upon how much he is valued outside of the group than within the group itself.

It would be predicted from this line of reasoning that inclusion of supervisory personnel in the sample would decrease the relationship between attraction and relative social worth. This does in fact occur. The correlation is .36 without supervisors and .20 when they are included, changing the significance level from .006 to .12, using the Attraction-Benefit measure. Similarly, when only persons with high frequency of contact are considered, the correlation decreases from .45 to .17 with the inclusion of supervisors, a change in significance level from .03 to .36.

From the foregoing presentation of results, it seems apparent that the hypotheses and the assumptions from which they were drawn receive considerable support. The findings also point more specifically to the populations, conditions, and contexts in which the generalizations may hold true. One other aspect of the research needs to be considered. It may be recalled that the exploratory investigation of reference group processes reported briefly at the beginning of this paper led to the formulation of hypotheses in objective rather than phenomenal terms. A parallel analysis was undertaken of data obtained in the Midwest Social Agency utilizing measures of *Perceived Social Worth* rather than its objective counterpart. Correlations were computed in both situational contexts, for high and low contact groups, for professionals and non-professionals, for supervisory and non-supervisory personnel, and

for work groups relative to the rest of the organization. None of the relationships found in this entire analysis even approached statistical significance.⁴

DISCUSSION AND CONCLUSIONS

Phenomenal vs. "Objective" Levels of Analysis

The decision to employ an "objective," i.e. consensual, level of analysis rather than a "subjective" one was influenced by the results of the exploratory study. Some positive relationship had been found between a person's attraction and his social worth computed by compounding the evaluations of other members, but none when his perception of his social worth was used in the analysis. Although the larger systematic issues of psychological theory cannot be dealt with here, these findings require some explanation.

The area of investigation called "person perception" has been undergoing a critical re-examination recently, resulting in a reformulation of many of its central problems. Thus the question of whether or not persons are generally accurate in their perception of others' feelings is no longer considered meaningful in that form, since the concept "accuracy" itself subsumes a large number of parameters that vary independently. Cronbach's statement sums up the state of knowledge about this question: "It would be foolhardy to state *what* has been shown by studies to date, but nonchance relations of some sort have been found in the majority of studies" (4). Tagiuri says that with respect to *self-referent accuracy*, which he uses to describe the particular problem under consideration here, there is evidence that persons are more accurate than chance about those who choose them, but not about those who reject them (27). One needs to be cautious, however, in generalizing his conclusions based on the criterion of *liking* to the present study's criterion, *valuing*, since the conceptual dimensions of the two terms are considerably different and the interpersonal processes involved may also differ.

Regardless of whether a person's perceptions are accurate or inaccurate, however, why is it that his attraction to membership does not vary according to what he perceives rather than to the objective situation? It is easy to adopt an extreme phenomenalism about human behavior and assume that a person is always responding to his private picture of reality. But perception includes all the fleeting, vague, ambiguous, and disorganized signs that pour in upon

⁴ A laboratory experiment was conducted by Wolff (30) to replicate the major findings of this study. He found that in a face-to-face group, where cues were made available experimentally to subjects that they were making valued contributions, both objective social worth and perceived social worth were positively related to subjects' attraction to the group. When, however, the cues were designed to signify to subjects that they were not valued, there were no such relationships. These findings are in accord with Tagiuri's conclusions, discussed in the following section (27).

the person. True, he is constantly attempting to organize them into a meaningful pattern, to focus upon those which are central and salient and to ignore the rest. Yet clearly this selectivity must of necessity ignore the vast majority of his sensations, if one may use this classical term, among which may be the significant signs that he is valued or not. Thus the person's behavior might be steered by the total flux of incoming percepts and the gratification-deprivation value they have for him, whether or not he is able to organize them into a meaningful conception and is aware of the meaning. The fact that a person's attraction varies directly with the actual evaluations of others with whom he interacts, but is not related to his perceptions of how much they value him, seems to require some such interpretation.

Direction of Causality

The correlations in the data have been accepted as evidence in support of a particular model of reference group processes, one in which a prestige structure generates a pattern of evaluative signs that is communicated by means of interpersonal contact among members of the system and which affects their desire to belong. Common to all such cross-sectional studies is the problem of causal direction. Why would it not be just as correct to say that, if a person is highly attracted to membership, he attains relatively higher social worth and that the former causes the latter? Certainly there is ample justification in the literature for maintaining that attraction causes conformity (1, 7, 8, 10, 15, 24), or even high productivity if group standards call for it (25). The assumption has already been made above that the allocation of prestige is based on compliance with group norms and contribution to group goals. Thus the generalization that the strength of a person's attraction to membership determines his social worth appears to be an equally acceptable interpretation of the results.

If attraction indirectly causes social worth, however, it is not clear why a high level of interpersonal contact is necessary for the process to occur. A person highly motivated to belong presumably could adhere to group standards and contribute to group objectives even if he were relatively isolated in the system. It may be that in the absence of contact with others, the person would be insufficiently informed with respect to group goals and approved means of attaining them; or that the characteristics and products of his behavior would be inadequately known or appreciated by other members. In either case his social worth would not attain a level commensurate with his attraction.

It is also possible that both interpretations are correct and that the correlations are produced by circular causal processes in the social system. The communication to members of signs that they are valued or de-valued does

act to increase or decrease their attraction to membership; and this in turn regulates the degree to which they behave in accordance with role expectations concerning compliance and contribution, which thus determines the position allocated to them in the prestige hierarchy.

Formal and Informal Status

The Midwest Social Agency was under the jurisdiction of a department of state government. Its staff occupied positions whose formal status and level of remuneration were determined by civil service regulations. Subjects of the study were distinguished, therefore, by differences in formal status as well as by the informal status described here as "social worth." An interpretation of the results that should be discussed, since formal status and social worth are positively correlated, is that the relationships found are attributable to the former variable. People who have higher status, more important positions, greater prerogatives including salary, report that they receive greater benefits by being members of the social system.

There are a number of reasons why this apparently straightforward explanation is less acceptable. The non-professional members of the staff occupied a formal status scale of seven levels which overlapped the professional five-level scale, yet none of the predicted relationships were found for non-professionals. The relationships were greater in the context of small work groups where informal status should be relatively more important than in the total organization; and they were also greater when seven subjects with extremely high formal status were removed from the sample. The fact that frequent interpersonal contact among members is necessary for attraction to be related to social worth is difficult to reconcile with the formal status interpretation. Finally, the relationships found, when a person's social worth in his work group is compared with his prestige outside his group, point to the importance of the informal status system, since a person's formal status is the same throughout the organization.

Professionals and Non-Professionals

The differences found between professionals and non-professionals were not predicted in advance; yet *ex post facto* they seem obviously to derive from the special character of the social system that was studied. In an organization whose primary goals and standards are professional, the prestige system is organized around these goals and standards. As Parsons has pointed out (22, p. 196), the institutional patterns that govern the action of professionals lead to a different definition of the situation for them. Their motives are shaped to seek the particular type of gratifications available. In view of the relative

strength of relationships found with the Attraction-Benefit and Attraction-People scales, one is tempted to say that professionals as a class tend to be achievement- rather than affiliation-oriented (11). Professionals participate in the prestige system; in effect they create the game with its rules and they play it. Whatever benefits non-professionals receive do not originate in the same prestige system. It is likely that they have their own informal status structure, unfortunately not observed in this research. It is also possible that the benefits obtained by non-professionals are not contingent upon compliance or contribution, except insofar as the latter are conditions for remaining members of the social system.

The above discussion would appear to have implications for generalizing the findings of this or other studies of reference group processes. In any stratified or differentiated social system, different degrees and kinds of gratification are available to particular categories of members. What may be appealing or satisfying to the needs of some may not activate the dominant motives of others. Thus, for reference group orientations to occur, a matching of motives to available gratifications seems to be a necessary condition.

Context of Reference Group Processes

The relative magnitude of relationships between attraction and social worth found in the two different contexts suggests that reference group processes are stronger within the small work group than in the organization at large. These findings are consistent with the Cooley-Mead traditional emphasis upon the significance of the face-to-face group for a person's motivation and behavior. It is in the small group that the person's interaction is concentrated and most intense. The expectations upon him are clearer, his behavior more exposed, and his compliance and contribution more readily evaluated. The research provides evidence, however, that the same processes occur in the larger system, as long as there is an adequate amount of interaction among its members.

Functions of Interaction

The results of the research suggest a number of different functions served by interaction among members of a social system, both for the individual members and for the system itself. It may be assumed that the mediating process between social worth and attraction involves the communication of information about the group's approved purposes and procedures, and evaluations of members' activity. With sufficient contact among members of a system, continuous feed-back mechanisms are at play, distributing information about expectations and symbolic rewards or punishments in terms of the

quality of members' compliance or contribution. Thus interaction functions to provide individual members with social reality concerning others' expectations and evaluations, reinforcing approved behavior and extinguishing disapproved, and attracting or repelling them from membership.

At the same time interaction functions to maintain the quality of the social system, since it serves to draw into more central membership positions those persons who are highly valued, and to make peripheral or repel from membership those who are judged to be making little contribution. With ideal interaction among members, which would imply perfect accuracy and optimal quantity, ultimately only members who made contributions to the system would remain within it.

This view of the function of interaction and reference group⁵ processes in the social system implies that members are constantly in a state of flux, even though apparent stability meets the eye of the observer. Some are gravitating toward more central membership, others are moving away from the system. Logically it would also have to be assumed that some members are the recipients of just the precise amount of gratification, relative to that obtainable elsewhere, necessary to maintain their relationship to the social system in a state of equilibrium.

SUMMARY

Although there is considerable evidence that the strength of a person's motive to belong to a group significantly affects his feelings and behavior, less is known about the sources of his attraction, the processes that mediate his orientation toward a single or competing groups, or the conditions under which these processes occur. This paper reports an investigation within a formal organization of these and related problems of reference group behavior.

The research began with some elementary assumptions about the nature of persons and groups: that individuals attempt to maximize personal gratification and minimize deprivation in their social interaction; that the prestige system of a group or organization generates evaluative symbols that are transmitted in face-to-face contact; and that a person's level of gratification is directly related to the character of the evaluative signs he receives in his interaction with others. The study was designed to test the following hypotheses derived from these generalizations.

1. *In any group or organization a person's attraction to membership is directly related to the magnitude of his social worth.*

⁵ *Reference group* is used here in a generic sense. Elsewhere it has been proposed that the concept is too inclusive to describe the variety of person-group relationships to be found in a complex social system (14).

2. *The magnitude of the positive relationship hypothesized in (1) varies directly with the volume of interaction the person has with other members of the group or organization under consideration.*

3. *Where alternative group orientations are possible for a person, his relative attraction to membership in one or another group is directly related to his relative social worth in the groups considered.*

4. *The magnitude of the positive relationship hypothesized in (3) varies directly with the volume of interaction the person has with other members of the groups under consideration.*

Data were obtained from the members of the staff of a child welfare agency selected because it met the demands of the theoretical problem. Three questionnaires were administered, one month apart, to elicit information about the work group structure, the frequency and type of interpersonal contact, the source and strength of attraction to membership, and the informal prestige system. Hypotheses were tested, using a correlational analysis, in the context of both work group and organizational membership.

The results support the hypotheses and the assumptions from which they were drawn, but point much more specifically than did the initial theorizing to the populations, conditions, and contexts in which these generalizations may be valid. The fact that hypotheses are supported by data from professional members of the staff but not from non-professionals, and more strongly so when achievement rather than affiliation motives are involved, implies that reference group orientations are significantly affected by the degree of matching of dominant motives to available gratifications. Reference group processes are also seen to occur with especial strength in small face-to-face groups where, to a relatively greater degree than in the organization as a whole, interaction is intense, expectations clear, behavior exposed, and compliance and contribution readily evaluated. With sufficient interaction, however, similar processes occur throughout the larger system.

The research suggests that reference group processes are continually at work distributing gratifications and deprivations in social interaction and modifying individuals' desire to belong. A dynamic view of social structure emerges, with some persons moving in the direction of increased psychological membership, some in relative equilibrium, and others gradually drifting toward psychological non-membership.

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Attitude Change by Response Reinforcement: Replication and Extension¹

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Within the framework of S-R learning theory an attitude may be regarded, like a habit, as an implicit anticipatory response which mediates overt behaviors, and arises out of them through response reinforcement (6). Such a conception provided the basis for an earlier study (9) of the effect on attitudes of rewarding relevant verbal behaviors. The purposes of the present experiment were to substantiate the earlier results with different operations, to investigate the effects of response reinforcement on subjects with neutral, as well as extreme, attitudes, and to determine whether or not the induced attitude change were "permanent."

Briefly, the design of the earlier study (9) was as follows: Pairs of students were selected from a number of general psychology classes and asked to debate any of three different issues on which they had previously expressed their opinions. However, both members were required to defend sides of the issue opposite to those which they actually held. The excellence of their presentations was to be judged by class vote, but this vote was falsified so that a predetermined member of each pair won. Posttests of subjects' attitudes showed that the "winners" had changed in the direction of debate significantly more than the "losers" and more than a group of control S's, while the "losers" did not change significantly more than the controls.

This study had used only S's with initially extreme attitudes, and no provision had been made for a second posttest to determine the extent to which the attitude changes persisted. Therefore, a new experiment was designed to fill these gaps. Although the design was conceptually similar to the previous one, the actual operations differed in several respects: different issues were presented, S's debated under different conditions, and the nature of the reinforcing stimuli was different. Given these innovations in operations (not in conceptualization), it was felt that corroborative results would better serve to substantiate the theory on which the experiments were based than would replication by identical operations.

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METHOD

Attitudes of students toward three different controversial issues were assessed in several General Psychology classes, by the following open questions:

1. *Curriculum.* If you had the job of laying out a curriculum of required courses for all undergraduates at CU, what kinds of courses would you lay most emphasis on—those related to the study of scientific facts and research methods, or courses dealing with social problems and courses which help the student learn more about people?

2. *Fraternities and sororities.* Some people feel that fraternity and sorority life contributes a great deal to the development of the student during his college career. Others feel that fraternities and sororities work to the detriment of students by taking their attention away from more important academic matters. What do you think about this?

3. *Ideal husband or wife.* If you were thinking of getting married, which kind of a husband or wife would you rather have: One who is mainly interested in people and enjoys being with people, or one who has a wide variety of interests and creative talent in some area?

Immediately after this pretest, a general invitation was addressed to the classes to participate in an elimination debate contest, the winners of which would share a \$100 cash prize. The investigator's interest was reported to be "to find out what kinds of people hold what kinds of attitudes." A couple of weeks later volunteers were contacted by phone and asked to take a particular side of one of the three issues for debate. The sides were assigned irrespective of Ss' initial positions, so that some debaters defended their own opinions, some the opposite opinions, and some debated "off-neutral" (they expressed no clear opinion on the pretest, but were assigned a definite position in the debate). The only restrictions were to keep these three groups (same, opposite, and off-neutral) approximately equal and to give equal representation to each of the three issues. Ss were told that debate positions were being assigned irrespective of actual attitudes, because "the purpose of the study is to see how well people can present opinions they don't actually hold, and how well their opponents can judge their own true attitudes."

The debates took place in a small research room, with the two Ss seated at one end of a long table, and three judges at the opposite end. For every debate, two of the judges were professors of psychology, and the third was a mature graduate student; E was one of the judges at every debate, but the other judging professor and the graduate student were changed several times throughout the experiment. Introductions were formal, as was the decorum of the entire procedure. None of the Ss had known his opponent prior to that time. It was explained that the winner of this first debate would be contacted for a second debate, and if he won that, as well as a third debate, he would receive a \$20 prize. Ss presented their initial arguments for five minutes each, followed by two-minute rebuttals in reverse order.

Each judge, in turn, rendered his decision on the relative merits of the two performances. The reasons he offered for his decision were confined to the manner of presentation (style, clarity, convincingness, etc.), rather than to the content of the talk, in order to minimize the possible influences of prestige suggestion which might be entailed if the judgment referred to the substance of the argument (e.g., "that was a good point"). The winner in each case had been predetermined in systematic fashion, so that all the judges had to do during the debate was to jot down plausible reasons for their decisions.

Following the judgment, S's were led to small individual rooms near the debate room, where they filled out questionnaires on the three issues, identical with those from the pretest. E indicated that "we are interested in seeing how you feel about these matters at this time," without explicitly indicating that opinions were expected either to change or to remain constant. In addition there was the question, "How do you think your opponent *really* feels about this issue?" included simply to maintain the pretext previously offered for the study.

Winning S's were called back about ten days later to debate a different issue. Their positions were again assigned irrespective of their true attitudes, and the debating situation was as before, except that judgments of win or lose were based on merit (as the judges saw it).² There were no predetermined winners or losers, so occasionally there was a split vote among the three judges; but E always voted last, in order to make the decision as clear and definite as possible. A second posttest of attitudes toward the three issues was obtained. (S's wrote in separate rooms.)

Winners of the second debate were recalled for a third time, to debate the remaining issue of the three. The consequences of this contest were made clear, and S's were given the choice of "winner take all" (\$20) or "split the prize" (\$15 and \$5). Three pairs chose the former division; two, the latter. Again the voting of judges was genuine; a third posttest of attitudes toward all three issues was obtained.

Attitudes expressed in the pretest and on the three posttests were typed on 3" x 5" cards, numbered in such a way as to disguise their sources (see 9). These were then coded by E on a seven-point attitude scale, representing a neutral position and three degrees of intensity toward each extreme of the issue—e.g.:

1. Greek organizations are very definitely a help.
2. Greek organizations are a help.

² This shift in the basis for determining winners was largely for ethical reasons. Though a random choice of winners was necessary for purposes of experimental control, once this had been achieved on the first round of debates, there appeared to be no reason why virtue should not be rewarded.

3. Greek organizations are mainly a help, but also some hindrance.
4. Don't know; not ascertained; equally a help and a hindrance; depends on the individual.
5. Greek organizations are mainly a hindrance, but also some help.
6. Greek organizations are a hindrance.
7. Greek organizations are very definitely a hindrance.

Check-coding, by an independent judge, of a sample of these attitudes showed their coding reliability to be .87.

RESULTS

Of principal interest is the comparison of winners and losers on the first round of debates, for in that series they were randomly determined. The results are presented in the top part of Table 1, which shows that winners tended to change toward the side debated more than did losers or controls. (The control group was composed of those volunteers who could not be scheduled during the first debate series. Their posttest attitudes were assessed just after the third debate series, approximately one month after the pretest.)

Attitude changes following the second and third debates were comparable to those in the first debate (see bottom of Table 1). It will be recalled that, here, the decisions were not predetermined, but depended on performance as estimated by the judges.

TABLE 1
Mean Attitude Changes of Winners, Losers, and Controls

Group of Subjects	N	Mean Change*	S.D. of Change	Difference in Mean-Changes
<i>First Debate</i>				
(A) Winners	20	+1.67	1.55	A vs. B: $t = 2.76$; $p < .01$
(B) Losers	20	+0.15	1.83	A vs. C: $t = 3.80$; $p < .001$
(C) Controls	15	+0.24	0.47	B vs. C: $t = -0.20$; NS
(D) Winners ten days later	20	+1.20	1.66	D vs. C: $t = 2.40$; $p < .05$
<i>Second Debate</i>				
(A) Winners	10	+1.40	1.80	A vs. B: $t = 1.29$; NS
(B) Losers	10	+0.36	1.62	
<i>Third Debate</i>				
(A) Winners	5	+2.80	1.72	A vs. B: $t = 2.88$; $p < .05$
(B) Losers	5	-0.20	1.17	

* A positive sign indicates a mean change in the direction of debate; or, for control S's, a mean change opposite to their original position. For control S's with initially neutral attitudes the directions of changes were assigned alternately positive and negative signs. One-tail tests of significance were used throughout.

Also of interest are the findings concerning "permanence" of the effects of reinforcement. As previously noted, all 20 S's who participated in the second debate were tested concerning their attitudes toward the issue of the first debate. From their responses it is possible to estimate the degree of "savings" from the first posttest to the second posttest—approximately ten days later. It is clear from the data in Table 1 ("first debate: Winners ten days later") that attitudes expressed on the second posttest are different, both from the pretest attitudes, and from the first posttest attitudes. Thus, there is a significant degree of savings from the first reward experience, even though the reinforcement is not explicitly repeated; but the amount of savings is less than the amount of initial change.

TABLE 2
Mean Attitude Change as a Function of the Relationship between S's Pretest Attitude and Debate Position

Group of Subjects	N	Mean Change*	S.D. of Change	Difference in Mean-Changes
<i>Debating Opposite Side</i>				
(A) Winners	10	+2.77	1.97	A vs. B: $t = 2.53$; $p < .05$
(B) Losers	10	+0.90	1.05	
<i>Debating Off-neutral</i>				
(A) Winners	11	+1.47	1.25	A vs. B: $t = 1.62$; $p < .10$
(B) Losers	13	+0.54	1.44	
<i>Debating Own Side</i>				
(A) Winners	7	+0.63	0.86	A vs. B: $t = 2.15$; $p < .05$
(B) Losers	13	-0.77	1.89	

* A positive sign indicates a mean change in the direction of debate. One-tail tests of significance are reported.

Since S's were assigned debate positions regardless of their own true attitudes, it is possible to see whether or not the response reinforcement was effective when it operated in the same direction as S's initial attitude, or when it aimed at moving him from a neutral position. Table 2 shows the results of the debates, grouped according to the relationship between S's initial attitude and his debate position. When S's debated "opposite sides," the absolute change of winners was largest (2.77 on a seven-point scale). When debating "off-neutral," the mean change was 1.47, and the mean change of winners debating their "own sides" was 0.63 toward a more extreme position in the same direction. A comparison of absolute changes in position is deceptive, however, since S's debating "opposite sides" had the greatest room for movement, and those debating "own sides" had the least. Relative to the amount of movement (in the direction of reinforcement) possible, the three groups showed changes of 55 per cent, 49 per cent, and 63 per cent, respectively. But since there is no

way of comparing scale intervals at various points on the dimension, it would be mere sham to conclude anything about the relative effects of response reinforcement under the three circumstances. All one can say is that winners tended to change in the direction of debate more than losers did, regardless of whether they debated their own positions, opposite positions, or off-neutral.

DISCUSSION

The results of this study suggest, first of all, that the effects of response reinforcement on attitude change are not necessarily transitory, but may be preserved up to periods of at least ten days. On the one hand, this may seem surprising, since, during the interval between tests, S's were presumably living within the same social contexts that had supported their initial attitudes. Thus one might expect them to revert to their old positions as soon as they were removed from the reinforcing situation. On the other hand, the occasion for the second posttest was so nearly identical with that for the first posttest, that the cues present could well have served to reintegrate the former response, even though it did not conform to S's true attitude at that time. In a more imaginative study, one might attempt a follow-up assessment of Ss' attitudes in a completely different context, with someone other than E eliciting the relevant response.

A second result suggests that response reinforcement can be effective either in strengthening previously held attitudes, in changing them, or in creating new ones (if those S's who debated "off-neutral" can be said to have developed "new" attitudes). There was no evidence to indicate that S's with neutral attitudes were more amenable to change than those with more extreme views. Such an outcome might have been expected in the light of the frequently reported finding that people who hold intense attitudes, or who are quite certain of their opinions, are relatively resistant to pressures to change (1, 2, 5, 7, 8). However, with less than interval-scale measures, it is difficult to compare relative movements at different positions on the attitude scale. Moreover, the status of the initially "neutral" attitudes is by no means clear, since that category included S's who expressed balanced opinions on both sides of the issue as well as those who replied "no opinion." It seems to this writer that neutrality of an attitude as such is probably not the critical feature for predicting susceptibility to change, but rather it is the degree to which the attitude, of whatever direction or strength, is embedded in a cognitive structure of other supporting attitudes and cognitive elements. (This quality of "embeddedness" has been referred to elsewhere as *cognitive consistency* [10, 11].)

The major significance of the study, however, would seem to lie in its confirmation of previously obtained results (9) not by exact replication, but by "methodological triangulation" (3). Whereas the earlier experiment required S's to debate in front of their fellow classmates and "rewarded" them by class vote, the present procedure involved debates in a private setting with reinforcement by judges' decisions and monetary reward. Moreover, the issues debated were different from those previously used. Thus one can safely maintain that the hypothesized relationship is not exclusively dependent on the particular methods chosen to assess it. When a number of different sets of empirical operations yield comparable results, it is reasonable to presume that they reflect a valid relationship (i.e., one that is independent of the measuring procedures), rather than just a reliable relationship (one that depends on a particular instrument or experimental design) (cf., 4).

SUMMARY

S's were invited to participate in a series of debates, in which they defended positions on three different issues irrespective of their own opinions. Comparison of their pretest attitudes with those expressed immediately following the debates indicated that S's who "won" (by judges' decision) tended to change their attitudes in the direction of the positions presented. This result confirmed that of a previous experiment in which S's debated under different conditions and were reinforced by vote of their classmates. The effect on "winners" in this study occurred regardless of whether they debated their own side of the argument, the opposite side, or from an initially neutral position. Some permanence of the change was evidenced on a second posttest about ten days after the initial winning. "Losers" in the debate did not change their attitudes significantly more than a control group of non-debaters.

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An Ordered Metric Measure of Social Distance

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The study of intergroup attitudes has commanded the interest of social scientists for several decades, but this topic has rarely lent itself to systematic investigation or precise measurement. This difficulty is apparent in the concept of "social distance," which Bogardus has defined as "the sympathetic understanding that exists between persons, between groups, and between a person and each of his groups. . . . [Social distance] may take the form of either farness or nearness. Where there is little sympathetic understanding, social farness exists. Where sympathetic understanding is great, nearness exists" (2, p. 106).

In 1933 Bogardus published his social distance scale (1), which has since enjoyed wide use in social research. Seven social situations are ranked according to the "social distance" each represents between the person and the group being considered (ethnic group, occupational group, religious group, etc.), and the person is asked to place each group at one of those ranks, indicating the degree of social nearness to which he is willing to admit members of the group. Thus, the Bogardus technique yields a ranking (ordinal scale) of various groups in terms of the social distance at which the subject would prefer to hold them.

The present paper concerns a technique for studying a person's attitudes toward a single group, and for obtaining a relatively sensitive measure of the social distance the person wishes to maintain between himself and that group. That is, the present technique is concerned not with scaling different groups in terms of social distance but rather with scaling social distances with reference to a single group. By the procedure to be discussed, a subject's *ordered metric scale* of social distances is determined. An ordered metric scale is one which not only represents the subject's ranked preferences among a set of entities (here, social distances) but also represents the relative differences in distances between these entities. Thus, in strength an ordered metric scale falls between an ordinal and an interval scale. The notion of ordered metric scaling was introduced by Coombs (3), and the method adapted for use in the present study was developed by Siegel (7), drawing upon the work of Ramsey (6), Von Neumann and Morgenstern (9), and Davidson, Siegel, and Suppes (4).

The technique presented here represents an extension of previous uses of

ordered metric scaling in these respects: (a) the scale concerns a topic central to social psychological research, (b) scales were collected from a number of subjects simultaneously, whereas previously an individual's ordered metric scale of preference had been determined by individual-interview methods, and (c) choices were required of the subjects concerning essentially imaginary events and in this sense were "unrealistic," whereas other ordered metric scaling had been done in a decision-making context with a real pay-off hinging on the subject's choices (cf. 5, 8).

METHOD

Subjects

Subjects serving in the study were 60 white female college students enrolled in psychology courses at a well known Southern liberal arts college for women.

For one part of the study, additional subjects were 51 white female college students enrolled in psychology courses at a well known Northern liberal arts college for women.

Scaling Procedure

Each subject was given a test booklet which introduced the study as being one centrally concerned with technicalities of a new measuring procedure and only incidentally concerned with "the race question." Subjects were explicitly instructed to withhold names and other identifying data, and complete anonymity was guaranteed.

The booklet consisted of four parts. In Part I, four social distance situations involving Negroes, situations of the Bogardus type, were presented, and the subject was asked to rank these in the order of her preference. The items were:

- A Negro allowed to enroll in your college.
- A Negro allowed to marry into your family.
- A Negro allowed to vote in elections in your state.
- A Negro allowed into your "social crowd" as a close personal friend.

In Part III, the same items were presented by the method of paired comparisons, each item paired with every other. The subject's responses in Parts I and III revealed her ordinal scale of preference for the four social distances, and provided a check on the consistency and transitivity of this scale.

In Part II, subjects were introduced to probability combinations of social distances, and were required to choose between pairs of probability combina-

tions. After extensive preliminary explanations, subjects were presented successively with five choices of probability combinations. The first choice is presented in full here, as an example:

WOULD YOU RATHER HAVE

Alternative A.

☐

A 50-50 chance that EITHER

(1) A Negro would be allowed to vote in your state.

OR

(2) A Negro would be admitted to your "social crowd" as a close personal friend.

OR WOULD YOU RATHER HAVE

Alternative B.

☐

A sure (100%) chance that a Negro would be allowed to enroll in your college.

If you select Alternative A, and one side of a fair coin turns up after a toss, then definitely a Negro will be allowed to vote in your state. If the other side of the coin turns up, then a Negro will be admitted to your social crowd as your friend.

If you select Alternative B, then, in any case, a Negro will definitely be allowed to enroll in your college.

If you prefer Alternative A, then place a check in the square by Alternative A. If you prefer Alternative B, then place a check in the square by Alternative B. Check only one, A or B.

For each of the five choices, the subject was asked to imagine that she would have to abide by the results of her decision, and therefore to choose the alternative which she would prefer to abide by. Further, she was instructed to imagine that the two outcomes under A have an equal likelihood of occurring, and that if she chose A the outcome which would actually occur would depend on the toss of a fair coin.

In Part IV, the final section of the test booklet, subjects were asked to examine the following five statements of opinion concerning school integration and to "select the *one* that most nearly represents your own opinion on the subject."

1. I would quit school rather than attend with Negroes at the present time.
2. I would not like attending schools with Negroes at the present time but but would not do anything to oppose it.
3. I would not mind attending school with Negroes at the present time.

4. I am mildly in favor of attending school with Negroes at the present time, but would not work toward making this possible.
5. I am strongly in favor of attending school with Negroes at the present time and would work toward making this possible.

This five-item scale on attitudes toward school integration was administered to the Northern college women as well as the Southern college women who were the principal subjects of the study.

RESULTS

Fifty-six of the Southern subjects completed the booklet. The remaining four returned incomplete booklets to the examiner.

Ordinal Scales of Social Distance

All of the subjects ranked the Bogardus social distance items with respect to Negroes in the same order: *vote*, *college*, *friend* and *marry*. Thus, as was expected, the ordinal scales of social distance did not in any way differentiate among the subjects.

Ordered Metric Scales of Social Distance

A subject's ordered metric scale of social distance items was determined from her choices among the probability combinations presented in Part II, by the method fully presented in (7). In that source it is shown that if, for example, a subject chooses Alternative A on the sample item displayed earlier, for her the social distance between *vote* and *college* is greater than the social distance between *college* and *friend*. On the other hand, for a subject who chooses Alternative B, the social distance between *vote* and *college* is smaller than the social distance between *college* and *friend*.

Two different ordered metric scales of social distance were yielded by the subjects. The majority of the subjects, 39, had the scale shown in Figure 1, on which the smallest distance is between *vote* and *college*. The others, 17, had the scale shown in Figure 2, on which the smallest distance is between



FIGURE 1

Scale 1: The Ordered Metric Scale of Social Distance Yielded by the Majority of Southern College Women

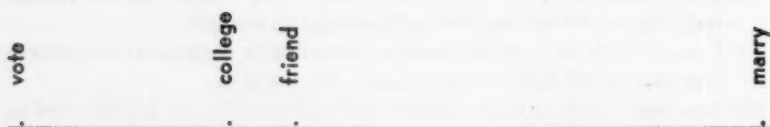


FIGURE 2

Scale II: The Ordered Metric Scale of Social Distance Yielded by the Minority of Southern College Women

college and *friend*. Notice that for both scales the largest single distance is between *friend* and *marry*, and notice further that this distance is larger than the combination of all other scale distances.

Ordered Metric Scales and Attitudes Toward Integration

To test the hypothesis that the ordered metric scale of social distance would discriminate among the subjects in terms of their attitudes toward school integration, subjects who yielded Scale I were compared, in attitudes toward integration, with subjects who yielded Scale II. The data are shown in Table 1. To obtain expected frequencies sufficiently large to permit use of the χ^2 test, subjects who agreed with statements 1 and 2 (on the scale of attitudes toward integration) were grouped in the "oppose integration" category, and those who agreed with statements 4 and 5 were grouped in the "favor integration" category. The "neutral" category contained those subjects who agreed with statement 3. For the data in Table 1, $\chi^2 = 6.56$, $p < .05$.

Perhaps a more revealing procedure is to examine the social distance scales of only those 38 subjects who either favored or opposed integration, dropping the 18 who were essentially neutral. As is shown in Table 2, the subjects who were opposed to integration yielded Scale I over Scale II at a ratio of three to one, whereas those who favored integration yielded Scale II over Scale I at a ratio of between two and three to one. For these data, $\chi^2 = 4.25$, corrected for continuity. This value is significant at $p < .05$.

Thus both methods of analysis reveal that the ordered metric scales of social distance differentiate Southern women with respect to prejudice, as this is reflected in stated attitudes toward integration.

TABLE 1
Subjects' Ordered Metric Scales and Attitudes Toward Integration

	Scale I	Scale II
Favor Integration	2	5
Neutral	13	5
Oppose Integration	24	7

TABLE 2
Subjects' Ordered Metric Scales and Attitudes Toward Integration

	Scale I	Scale II
Favor Integration	2	5
Oppose Integration	24	7

Comparison of Southern and Northern Women on Attitudes toward Integration

Data on the five-item scale of attitudes toward integration were collected from Northern college women to permit an informal check on the validity of the scale. It was predicted that the Northern women would be shown to be more favorable toward integration. As the data in Table 3 reveal, this prediction was confirmed; for these data, $\chi^2 = 40.9$, $p < .001$.

DISCUSSION

In the study of social distance, the advantages of ordered metric scaling over simple ordinal scaling are demonstrated by the following findings:

1. Ordinal scaling does not reveal individual differences as sensitively as does ordered metric scaling. In the present instance, the ordinal social distance scales of all Southern college women were identical, whereas their ordered metric scales were of two different types.

2. The individual differences revealed by ordered metric scaling are not meaningless or capricious, but rather are integral to the phenomenon under consideration. In the present instance, this was demonstrated by the finding that subjects who yielded Scale I were significantly more likely to oppose integration than were those who yielded Scale II.

Despite the superior power of ordered metric scales, they have not been used widely in social research, partly because of the time hitherto required to obtain each subject's scale in an individual interview. The present study demonstrates that, at least with reasonably intelligent and positively motivated subjects, a group test can be administered which makes it possible to obtain data for individual ordered metric scales simultaneously from large numbers of subjects.

TABLE 3
Northern and Southern Women's Attitudes Toward Integration

	Northern Women	Southern Women
Favor Integration	45	7
Oppose Integration	6	31

SUMMARY

A method is presented for determining the relative distances between social distance items of the Bogardus type. This method was employed with a group of Southern college women, all of whom ranked the social distance items (concerning Negroes) in the same order. Two different ordered metric scales were yielded, however, and these were shown to discriminate significantly between the subjects with respect to attitudes toward school integration. The scale of attitudes toward school integration was also shown to differentiate Southern and Northern college women, as expected.

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Sex Roles in a Three-Person Game*

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There have been carried out in recent years a good many studies of three-person groups, ranging from the simulation of a group task, in which, in actuality, the three participants do not interact directly (e.g., 8), to quite natural settings involving three members of a family (15). Such experiments have manipulated many different conditions—attitudes (5), channels of information (6), the roles of various members (7, 11), motivation (3), as well as the power variable presently to be specified (17).

Two general approaches are clearly discernible in these experiments. On the one hand, emphasis is placed upon the characteristics of the group itself. Thus, it may be arranged that samples of groups differ in some respect, by assigning persons with one property to one group and persons with a contrasting characteristic to another group, or by presenting one stimulus condition or set of instructions to one series of groups and different instructions to another series. For example, one might in either fashion endeavor to create groups high and low in motivation.

In the other technique, the internal properties of the group are manipulated, by varying the intra-group conditions in some appropriate manner. Thus, one may use confederates with predetermined roles, control the assignment of subjects to groups, or treat differentially members within the group.

Both procedures have much to recommend them and no doubt the experimental problem (or the theoretical issue) determines the choice between them. The area of research with which this study is concerned began with the second technique, but soon began also to demand comparisons between different samples of groups, as well.

The first experiment in this program sought to determine the sorts of coalitions that occur in triads composed of members with various degrees of power relative to each other (17). It was designed to test a series of hypotheses advanced by Caplow (4), who in turn had seen the significance of analyses by Simmel (14) and Mills (9, 10). The latter has for some time been developing a theory of three-person groups (9, 10, 11), important features of which have been that triads tend to divide into a pair and an isolate, as Simmel suggested, but, further that coalition formation is complex,

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depending upon characteristics of members and their organization, the task of the group, and the cycle of affective events during interaction. In fact, coalitions may take several forms—solidary, conflicting, dominant, and contending.

One condition that demands special consideration has to do with power differences among members. Caplow's hypotheses offer predictions for six types of power relationships, falling into three major classes, namely, (a) where all three are equal; (b) where one or two have less power but nevertheless any two in combination exceed the strength of the third; and (c) where one is stronger than the combined strength of the other two. The investigation by Vinacke and Arkoff (17) clearly substantiated Caplow's predictions that the formation of coalitions tends to follow the distribution of strength, so that the two weaker members tend to ally against the stronger in those situations where such combinations can win but few coalitions occur when one member can win without an alliance. The initiation of offers to ally and agreements concerning division of a prize also accord with power-relations. Since the experimental conditions and power-types are utilized in the present study, we shall describe them in full below.

The general principle suggested by Vinacke and Arkoff to account for their results is that players act in accordance with their perceptions of relative strength, rather than in terms of a rational analysis of final outcome, as might be deduced from the theory of games. We regard this point as sufficiently well established—at least under the conditions employed here—that there is no necessity to recapitulate the argument presented in the first report of this series. In short, predictions from game theory have not been supported, whereas those based on perception of strength have been.

Additional evidence on the importance of this determinant of behavior is afforded by the experiments of Torrance (16), Strodtbeck (15), and Hoffman, Festinger, and Lawrence (7). In all three cases, differences in perceived power appear to have been a dominating influence on the interaction of members.

As mentioned above, there immediately arises a question whether similar results would be found in other sorts of triads. In the Vinacke and Arkoff experiment, all subjects were male. It appeared that they entered, for the most part, competitively into the game, were eager to win and engaged in extended bargaining. By contrast, it was hypothesized, female subjects might be much less concerned with winning and more oriented towards social and ethical considerations—i.e., try to avoid an aggressive display of power and attempt, rather, to be "fair" to everyone.

The present experiment was conducted, then, to compare the play in a simple game-situation of all-male and all-female triads.

PROCEDURE

Data were obtained from 4 samples of three-person groups, two sets of all-male triads and two sets of all-female triads, with 30 groups in each set, or 120 in all (so that 360 different persons participated). The subjects were drawn from the regular college population, mostly from psychology courses, and all were volunteers. One set of each sex played the games as originally devised and described below,¹ whereas the other set of each sex played with the addition of a record sheet which showed the total number of points earned as the session progressed. The record was in full view of all players. This condition was added to increase motivation, and will be called the "Cumulative Score" condition. The first procedure will be designated "Game-by-Game" play.²

The game was a simple one, in which members competed for all or part of an arbitrary prize of 100 points per game. A standard pachisi board was modified by numbering the spaces consecutively from a "start." The object of play was simply to arrive "home" first. Each player, according to his power, moved ahead the number of spaces corresponding to the value of a single die, cast by the experimenter (E). All players moved on each throw. At any point in the game any player could offer to form an alliance with another player for an agreed-upon division of the prize. The offer need not be accepted. If accepted, the coalition was final for that game. Finally, any player could concede defeat, if he felt that he had no possibility of winning. This latter condition meant that a game could be decided at the outset, without actual play—and all groups soon discovered this fact. All these points (save the last) were contained in instructions read by each player before the game. E made certain that the rules were clear, and answered any questions that arose.

All games, therefore, were alike, except that the power relations among the players varied in six ways. Before each game, three differently colored counters were placed in a hopper, from which players drew at the start of the game. Each counter had on it a number, concealed at the time of drawing, which specified the power, or weight, of the recipient for that game. The weight represented the amount by which the die was to be multiplied (e.g., if the die came up "4," a player with a weight of "2" would move eight spaces). Players were at liberty to disclose their weights or not, as they pleased, and practically all did so immediately, despite some interesting variations; in any event, all players knew all weights as soon as the first move was made.

¹ The data from the first experiment are employed here, for the male triads under this condition.

² A later paper will deal with the effects of these and other motivating conditions.

The six power-patterns may be summarized as follows:

Type of Power-Pattern	Weights	Players
All Equal	1-1-1	A-B-C
One Strong	3-2-2	A-B-C
One Weak	1-2-2	A-B-C
One All-Powerful	3-1-1	A-B-C
One Strong, One Weak	4-3-2	A-B-C
One All-Powerful	4-2-1	A-B-C

The column headed "players" is included to serve as a key to the tables, since the data are organized to mean that a designated player always had the same power in each type. But "player" is not synonymous with "individual," for any member could draw any counter, and hence could be any "player." The different colors of the counters assured identification of players. For example, in Type 3-2-2, "A" always signifies a weight of "3" no matter which person drew that counter. Similarly, "player A" in Type I represents a counter drawn, not a person. Our interest in this study is not in particular individuals, but in the behavior associated with given strengths.

Finally, every triad played through all six types three times, making 18 games. By a Latin square arrangement, the types were randomized within each of three series, so that each series contained all six types, but in various orders.

A record was kept of all offers made, coalitions formed, and deals consummated, as well as other aspects of play.

The data to be analyzed in this report consist of the bargaining and outcome in each game of the series. The features of play may be expressed conveniently in the following ways: (a) outcome, whether *no coalition* occurred, whether a *triple alliance* was formed (i.e., all three members agreed to divide the prize), or whether two players joined their forces (*coalition*); (b) initiation of bargaining, or which player first offered to establish a triple alliance or coalition; (c) agreement concerning division of the prize (*deals*), or how many points were to be given to members of triple alliances or coalitions; and (d) number of offers made prior to final outcome (*bargaining*).

Analysis is based upon performance measures expressing either particular strengths or pairings. Measures were averaged per triad in the three games of each power type. It should be remembered that in this experiment we are concerned with power-position, and with combinations of power, rather than with particular S's. All measures, thus, express behavior associated with possession of given strength within the triad.

RESULTS

The first point in the analysis concerns the occurrence of coalitions. The requisite data are contained in Table 1. Each entry represents the number of triads that formed the indicated kind of alliance. For example, in the all-

TABLE 1
*Coalitions Formed by Male and Female Triads in Six Power Patterns under
 Two Conditions of Play*
 (N = 30 groups of each sex playing three games of each type)

Type of Power Pattern*	Incidence	Game by Game Condition						Cumulative Score Condition					
		Male			Female			Male			Female		
		AB	AC	BC	AB	AC	BC	AB	AC	BC	AB	AC	BC
All Equal	3	1	0	1	2	0	0	0	4	1	0	1	0
A-B-C	2	9	3	6	6	1	2	2	7	6	4	6	3
1-1-1	1	12	11	15	8	7	13	15	13	7	11	12	11
	0	8	16	8	14	22	15	13	6	16	15	11	16
Total		30	30	30	30	30	30	30	30	30	30	30	30
M vs. F**		AB AC BC			AB AC BC			AB AC BC			AB AC BC		
	χ^2	.32 2.58 3.46						.26 1.26 .00					
	n	1 1 1			1 1 1			1 1 1			1 1 1		
	P	<.70 <.20 <.10						<.70 <.30 -					
One Strong, Two Weak	3	0	0	13	1	0	9	0	0	5	0	0	1
A-B-C	2	1	1	11	1	1	12	4	3	8	2	2	10
3-2-2	1	11	9	4	8	4	7	9	8	15	13	13	13
	0	18	20	2	20	25	2	17	19	2	15	15	6
Total		30	30	30	30	30	30	30	30	30	30	30	30
M vs. F**		AB AC BC			AB AC BC			AB AC BC			AB AC BC		
	χ^2	.28 2.22 .80						.26 1.10 .28					
	n	1 1 1			1 1 1			1 1 1			1 1 1		
	P	<.70 <.20 <.50						<.70 <.30 <.70					
One Weak, Two Strong	3	1	2	0	0	1	0	1	0	0	0	0	0
A-B-C	2	4	10	3	7	3	4	3	6	6	3	3	7
1-2-2	1	13	14	9	14	12	16	14	16	9	21	16	11
	0	12	4	18	9	14	10	12	8	15	6	11	12
Total		30	30	30	30	30	30	30	30	30	30	30	30
M vs. F**		AB AC BC			AB AC BC			AB AC BC			AB AC BC		
	χ^2	.66 5.46 4.28						2.86 .70 .62					
	n	1 1 1			1 1 1			1 1 1			1 1 1		
	P	<.50 <.02 <.05						<.10 <.50 <.50					
One All- Powerful	3	0	0	0	1	0	0	0	1	1	0	0	1
A-B-C	2	2	3	0	2	4	5	2	4	0	4	2	2
3-1-1	1	7	4	9	7	8	8	4	5	6	4	7	5
	0	21	23	21	20	18	17	24	20	23	22	21	22
Total		30	30	30	30	30	30	30	30	30	30	30	30
M vs. F**		AB AC BC			AB AC BC			AB AC BC			AB AC BC		
	χ^2	.08 1.90 1.14						.36 .08 .08					
	n	1 1 1			1 1 1			1 1 1			1 1 1		
	P	<.80 <.20 <.30						<.70 <.80 <.80					

* This column defines the power relationship and indicates for each player (A, B, C) his weight for that game.

** The italicized figures in this and subsequent tables indicate the divisions used in computing χ^2 .

TABLE 1 (Continued)

Type of Power Pattern*	Incidence	Game by Game Condition						Cumulative Score Condition					
		Male			Female			Male			Female		
		AB	AC	BC	AB	AC	BC	AB	AC	BC	AB	AC	BC
One Strong,	3	0	0	9	0	0	6	0	0	5	0	0	5
One Weak	2	1	4	13	2	2	8	1	5	12	5	6	5
A-B-C	1	8	11	6	9	9	13	13	10	8	6	10	14
4-3-2	0	21	15	2	19	19	3	16	15	5	19	14	6
Total		30	30	30	30	30	30	30	30	30	30	30	30
M vs. F**		AB AC BC			AB AC BC			AB AC BC			AB AC BC		
		χ^2 .30 1.10 4.44			χ^2 .62 .08 3.30			χ^2 .62 .08 3.30			χ^2 .62 .08 3.30		
		n 1 1 1			n 1 1 1			n 1 1 1			n 1 1 1		
		P <.50 <.30 <.05			P <.50 <.30 <.05			P <.50 <.30 <.05			P <.50 <.30 <.05		
One All-Powerful	3	0	0	0	0	0	1	0	0	1	1	0	0
A-B-C	2	2	4	1	1	3	3	1	2	0	3	1	3
4-2-1	1	5	5	5	10	9	10	8	3	3	10	5	4
Total	0	23	21	24	19	18	16	21	25	26	16	24	23
Total		30	30	30	30	30	30	30	30	30	30	30	30
M vs. F**		AB AC BC			AB AC BC			AB AC BC			AB AC BC		
		χ^2 1.26 .66 4.80			χ^2 1.76 .12 1.00			χ^2 1.76 .12 1.00			χ^2 1.76 .12 1.00		
		n 1 1 1			n 1 1 1			n 1 1 1			n 1 1 1		
		P <.30 <.30 <.05			P <.30 <.30 <.05			P <.20 <.80 <.50			P <.20 <.80 <.50		

* This column defines the power relationship and indicates for each player (A, B, C) his weight for that game.

** The italicized figures in this and subsequent tables indicate the divisions used in computing χ^2 .

equal (1-1-1) power situation, the members who drew the counters called "A" and "B" established coalitions under the "Game-by-Game" condition, as follows: in one group, all three coalitions were formed between A and B, in nine groups two coalitions involved A and B, in 12 groups one coalition occurred between A and B, and in eight groups none of the alliances were of this kind. It can be seen, in the first place, that there are few differences between the sexes which attain the 5 per cent level. None at all are found under Cumulative Score Conditions; under Game-by-Game Conditions significant differences occur for "AC" and "BC" alliances in Type 1-2-2, "BC" alliances in Type 4-3-2, and "BC" alliances in Type 4-2-1. With the possible exception of Type 1-2-2, the male groups appear to play more in accordance with the initial pattern of strength—i.e., the two weakest members ally more frequently in Type 4-3-2, and there is a greater tendency to avoid coalitions in Type 4-2-1. The results under Cumulative Score Conditions are quite consistent, but do not reach statistical significance.

Despite these differences, it is evident from Table 1 that both sexes

strikingly follow the general strategy previously reported for male groups, namely, the two weakest members tend to ally against the stronger, when this is possible. The prevalence of these tactics may be seen by comparing the incidence of "BC" alliances in Types 3-2-2 and 4-3-2 with the other two pairings. The tendency is not as marked in Type 1-2-2, which appears to be closer to the all-equal Type 1-1-1 than the unequal power situations.

Important sex differences appear in Table 2, which presents an analysis of "triple alliances" (when the three players decide upon a three-way division

TABLE 2
*Incidence of No Coalition and Triple Alliance in Male and Female Triads under
Two Conditions of Play*
(N = 30 groups of each sex playing three games of each type)

Type of Power Pattern		Game-by-Game Condition				Cumulative Score Condition*			
		No Coalition		Triple Alliance		No Coalition		Triple Alliance	
		M	F	M	F	M	F	M	F
Any Two Can Win (1-1-1 + 3-2-2 + 1-2-2 + 4-3-2)	2 or more	5	14	2	15	8	10	4	10
	0 or 1	25	16	28	15	22	20	26	20
	Total	30	30	30	30	30	30	30	30
	χ^2	6.24		13.88		.32		3.36	
	df	1		1		1		1	
	P	<.02		<.001		<.70		<.10	
One All-Powerful (3-1-1 + 4-2-1)	4 or more	21	12	0	2	22	17	2	4
	0 to 3	9	18	30	28	8	13	28	26
	Total	30	30	30	30	30	30	30	30
	χ^2	5.46		—		1.84		—	
	df	1		—		1		—	
	P	<.02		—		<.20		—	

* Under the Cumulative Score Condition, the combination of no coalition + triple alliances yields a significantly greater occurrence in the female groups ($\chi^2 = 4.02$, $df = 1$, $P > .05$).

of the prize, usually on equal terms) and failure to form coalitions at all. It is clear that female triads both ally less often as pairs against a third and more often establish triple alliances. Both tendencies are much reduced under Cumulative Score Conditions. Nevertheless, the general style of female strategy is clearly brought out, even under the more competitive condition, when the occurrence of "no coalition" and "triple alliance" is combined. As shown at the bottom of Table 2, whereas 12 female triads arrived at three or more of these outcomes in the 12 games of Types 1-1-1, 3-2-2, 1-2-2, and 4-3-2, only five male triads did so ($P < .05$). In the "all-powerful" types, 3-1-1 and 4-2-1, few triple alliances occur, but females more often form

TABLE 3

Initiation of First Offer to Ally in Male and Female Triads in Six Power Patterns under Two Conditions of Play

(N = 30 groups of each sex playing three games of each type)

Power Pattern	Incidence	Game-by-Game Condition						Cumulative Score Condition					
		Male			Female			Male			Female		
		A	B	C	A	B	C	A	B	C	A	B	C
All Equal	3	1	1	2	0	2	1	0	0	1	1	0	3
A-B-C	2	5	9	3	5	7	0	3	7	9	3	7	5
1-1-1	1	10	9	14	13	12	14	13	13	14	14	9	9
	0	14	11	11	12	9	15	14	10	6	12	14	13
Total		30	30	30	30	30	30	30	30	30	30	30	30
M vs. F		A			B			A			B		
		χ^2			.28			.28			1.10		
		n			1			1			1		
		P			<.70			<.70			<.30		
One Strong	3	1	3	2	0	0	0	0	1	1	1	0	1
A-B-C	2	2	8	8	0	9	8	4	7	7	1	7	9
3-2-2	1	10	15	10	9	18	17	10	12	15	10	12	12
	0	17	4	10	21	3	5	16	10	7	18	11	8
Total		30	30	30	30	30	30	30	30	30	30	30	30
M vs. F		A			B			A			B		
		χ^2			1.14			.28			.06		
		n			1			1			1		
		P			<.30			<.70			<.90		
One Weak	3	4	1	1	2	0	0	0	0	1	0	0	2
A-B-C	2	4	2	3	7	4	6	5	5	6	6	3	5
1-2-2	1	14	11	18	14	10	9	11	17	10	15	15	11
	0	8	16	8	7	16	15	14	8	13	9	12	12
Total		30	30	30	30	30	30	30	30	30	30	30	30
M vs. F		A			B			A			B		
		χ^2			.08			1.76			1.20		
		n			1			1			1		
		P			<.80			<.20			<.30		
One All-Powerful	3	0	1	0	0	0	0	0	0	0	1	0	1
A-B-C	2	1	3	0	0	4	4	1	2	6	0	4	2
3-1-1	1	1	9	9	7	11	13	5	6	4	6	7	7
	0	28	17	21	23	15	13	24	22	20	23	19	20
Total		30	30	30	30	30	30	30	30	30	30	30	30
M vs. F		A			B			A			B		
		χ^2			3.28*			.10			.70		
		n			1			1			1		
		P			.06			<.80			<.50		

* By Fisher's exact test.

TABLE 3 (Continued)

Power Pattern	Incidence	Game-by-Game Condition						Cumulative Score Condition					
		Male			Female			Male			Female		
		A	B	C	A	B	C	A	B	C	A	B	C
One Strong,	3	1	0	5	0	2	0	0	3	1	1	1	1
One Weak	2	3	6	10	1	8	7	6	5	8	5	6	4
A-B-C	1	9	13	10	14	11	16	7	15	10	11	13	17
4-3-2	0	17	11	5	15	9	7	17	7	11	13	10	8
Total		30	30	30	30	30	30	30	30	30	30	30	30
M vs. F		A			B			C			A		
	χ^2	.26			.30			4.58			1.08		
	n	1			1			1			1		
	P	<.70			<.70			<.05			<.30		
One All-Powerful	3	0	0	0	0	1	0	0	1	1	0	0	1
A-B-C	2	2	0	3	0	1	5	2	1	1	2	1	2
4-2-1	1	0	9	10	7	10	15	4	3	5	7	8	9
	0	28	21	17	23	18	10	24	25	24	21	21	18
Total		30	30	30	30	30	30	30	30	30	30	30	30
M vs. F		A			B			C			A		
	χ^2	3.28			1.14			3.30			.80		
	n	1			1			1			1		
	P	.06*			<.50			<.10			<.50		

* By Fisher's exact test.

alliances than do males (i.e., there is a greater incidence of "no coalition" in male triads, not significant under Cumulative Score Conditions).

Another feature of play concerns the power of the player who first initiates an offer to ally, as revealed in Table 3. The only differences that attain the 5 per cent level of significance are found in Types 3-1-1, 4-3-2, and 4-2-1 under Game-by-Game Conditions, those, that is, in which internal power differences are the greatest. Although significant at the 5 per cent level in only one comparison, there is a consistent tendency for females to offer to form an alliance more frequently in Types 3-1-1 and 4-2-1, when none is necessary.³ In Type 4-3-2, the reverse takes place, with the weakest member less likely to make an offer among female members. Again, the same picture emerges under Cumulative Score Conditions, but so much reduced as not to attain statistical significance.

Table 4 presents an analysis of the kinds of deals formed by the two sex groups. The data are arranged to bring out as clearly as possible the differences between the two sexes, and a word of explanation may be helpful. First, the

³ The fact that the difference in Type 3-1-1 is significant for "C," but not for "B," is a peculiarity for which no ready explanation is available—the difference is in the same direction, however.

TABLE 4
Agreements on Division of Prize by Male and Female Triads under Two Conditions of Play
 (N = 30 groups of each sex playing three games of each power type)

Power Pattern	Deal*	All Games Played				Two-Person Deals Only			
		Game-by-Game		Cumulative Score		Game-by-Game		Cumulative Score	
		M	F	M	F	M	F	M	F
All Equal	51 or more	19	4	13	5	7	3	8	7
A-B-C	50	3	8	10	9	13	2	7	3
1-1-1	49 or less	8	18	7	16	10	20	14	16
	Total**	30	30	30	30	30	25	29	26
	χ^2	6.78		5.68		11.97		.97	
	n	1		1		1		1	
	P	<.01		<.02		<.001		<.50	
One Strong	51 or more	19	7	17	11	7	4	10	9
A-B-C	50	10	13	6	7	12	4	9	6
3-2-2	49 or less	1	10	7	12	11	22	10	14
	Total	30	30	30	30	30	30	30	30
	χ^2	9.02		1.92		8.14		1.14	
	n	1		1		1		1	
	P	<.01		<.20		<.01		<.30	

* Average points given to member with advantage, except that "50" signifies 50/50 agreements.

** Difference from 30 shows number of groups that formed no alliances or no two-person alliances.

TABLE 4 (Continued)

Power Pattern	All Games Played					Two-Person Deals Only				
	Deal*	Game-by-Game		Cumulative Score		Deal*	Game-by-Game		Cumulative Score	
		M	F	M	F		M	F	M	F
One Weak	51 or more	20	10	13	14	60 or more	19	6	13	12
		-	-	-	-					
A-B-C	50	1	6	4	4	51-59	5	8	9	5
		-	-	-	-		-	-	-	-
1-2-2	49 or less	9	14	13	12	50	6	16	7	13
		-	-	-	-		-	-	-	-
	Total**	30	30	30	30		30	30	29	30
	χ^2	6.68		.08			7.18		2.42	
	n	1		1			1		1	
	P	<.01		<.80			<.01		<.20	
One All-Powerful	25 or more	11	16	11	13	51 or more	10	10	9	10
		-	-	-	-		-	-	-	-
A-B-C	1-24	9	9	9	8	50	10	14	9	8
		-	-	-	-		-	-	-	-
3-1-1	0	10	5	10	9	0	10	6	12	12
		-	-	-	-		-	-	-	-
	Total	30	30	30	30		30	30	30	30
	χ^2	1.68		.28			1.36		0	
	n	1		1			1		1	
	P	<.20		<.70			<.20		-	

* Average points given to member with advantage, except that "50" signifies 50/50 agreements.

** Difference from 30 shows number of groups that formed no alliances or no two-person alliances.

TABLE 4 (Continued)

Power Pattern	Deal*	All Games Played				Two-Person Deals Only			
		Game-by-Game		Cumulative Score		Game-by-Game		Cumulative Score	
		M	F	M	F	M	F	M	F
One Strong, One Weak	51 or more	23	9	22	14	12	6	15	9
		-	-	-	-	-	-	-	-
A-B-C	50	5	10	3	8	12	7	7	7
		-	-	-	-	-	-	-	-
4-3-2	49 or less	2	11	4	8	6	17	6	13
		-	-	-	-	-	-	-	-
Total		30	30	29	30	30	30	28	29
	χ^2	13.12		5.29		8.54		3.50	
	n	1		1		1		1	
	p	<.001		<.05		<.01		<.10	
One All-Powerful	25 or more	12	17	9	17	13	10	10	12
A-B-C	1-24	4	8	6	5	3	13	2	8
		-	-	-	-	-	-	-	-
4-2-1	0	14	5	15	8	14	7	18	10
		-	-	-	-	-	-	-	-
Total		30	30	30	30	30	30	30	30
	χ^2	6.24		3.46		3.60		4.28	
	n	1		1		1		1	
	p	<.02		<.10		<.10		<.05	

* Average points given to member with advantage, except that "50" signifies 50/50 agreements.

** Difference from 30 shows number of groups that formed no alliances or no two-person alliances.

incidence of equal division (50/50 deals) is shown in all those cases where it adds to the information given. Second, the categories into which "Deals" are divided differ for the two sides of the table. In "All Games Played," the average for a group can range from 0 (no alliances of any kind) to 100 (one member is assigned all points in each game of that type). Scores of 100 did not occur here, but have occurred in other experiments. On the other hand, deals involving only two parties have a lower limit of 50 (one member must obviously be given at least 50 out of the 100 points). Third, the data for two-person deals are presented separately to permit a fuller interpretation of the character of play—especially to show that the two sexes differ not merely because of differences in the incidence and kinds of alliances formed.

Looking first at the power patterns in which any two can win (1-1-1, 3-2-2, 1-2-2, and 4-3-2), it may be seen that males more frequently establish alliances on a disproportionate basis; i.e., one member gets more than 50 points (50 per cent of the prize). This difference is statistically significant throughout under the Game-by-Game condition of play. Under the Cumulative Score condition, however, it is significant only for Types 1-1-1 and 4-3-2 and then only when all games are averaged; when two-person deals only are included, there are no significant differences between the sexes under the Cumulative Score condition.

Turning to the power patterns in which one member is all-powerful (Types 3-1-1 and 4-2-1), a contrasting result occurs. Sex differences are not statistically significant in Type 3-1-1, but in Type 4-2-1, females form more alliances than do males (significant for the average of all games under Game-by-Game play, for two-person deals under Cumulative Score play).

A general comparison of the bargaining situation is made in Table 5. In

TABLE 5
Frequency of Bargaining by Male and Female Triads under Two Conditions of Play
(N = 30 groups of each sex playing three games of each type)

		Game-by-Game Condition		Cumulative Score Condition	
		Male	Female	Male	Female
Offers in Patterns					
Where Any Two Can Win (1-1-1, 3-2-2, 1-2-2, 4-3-2)	Mean	20.2	16.5	22.8	22.0
	SD	6.3	7.9	14.3	14.0
	t	1.98*		.21	
Offers in Patterns					
Where One Is All-Powerful (3-1-1, 4-2-1)	Mean	5.8	5.6	5.3	6.7
	SD	4.4	3.1	5.3	4.9
	t	.23		1.00	

* With $n = 29$, $P < .10$.

this analysis, every offer made was considered to be one instance of bargaining. The total number of offers made in all the games of a comparable sort (i.e., when any two could win by forming a coalition, on the one hand, and when one member was all-powerful, on the other hand) was treated as a score. The resulting distributions were such as to render a t-test appropriate. Each mean given in the table is the average number of offers made by the set of triads under the indicated condition. Little difference occurs for Types 3-1-1 and 4-2-1, but there is a large, although not significant, difference for the combined results in patterns where any two can win (1-1-1, 3-2-2, 1-2-2, 4-3-2), under Game-by-Game Conditions, since males engage more frequently in extended bargaining sequences. This tendency disappears under Cumulative Score Conditions. Thus, the introduction of the more competitive situation appears to have a considerable effect upon the play of females, bringing about more offers prior to final agreement. We shall discuss below the implications of this result, for it does not necessarily signify that the competitive situation has the same character for the two sexes.

DISCUSSION

Insofar as the general pattern of play and outcome are concerned, male and female triads display important similarities. In accordance with an earlier report (17), perceptions of power relations determine to an important degree who initiates the first offer to ally, who forms an alliance with whom, and what agreement is reached with respect to division of the prize. When all three members are equal (1-1-1), there is no consistent tendency for any pair (by strength) to differ from any other pair.⁴ With power differences, but when any two can win, the weaker tend to ally against the stronger (Types 3-2-2, 1-2-2, and 4-3-2, although much less strikingly in Type 1-2-2, where only one member is weak). Finally, when one can win without coalition, many fewer alliances are formed.

It is only when we examine certain special features of play that sex differences appear, and they afford revealing cues to what we have come to consider the different approaches of the two sexes in this kind of socialized competitive situation. Recall that female triads, in contrast to male triads, more often arrived at triple alliances, more often failed to make coalitions when it was advantageous to do so but did make them more often when no advantage was to be gained, less often agreed to a disproportionate division of the prize, and displayed a tendency to bargain less extensively. On the other

⁴A comparison of play in the Game-by-Game versus Cumulative Score Conditions will show that, although allies AC are under-represented in the former, they are over-represented in the latter.

hand, the marked reduction in these tendencies under Cumulative Score Conditions suggests that the introduction of the score served to increase interest for the females, whereas it did not appear to change the male performance. Despite this increased involvement, however, the female triads nevertheless continue to differ consistently from the males in the respects mentioned, as well as in ways that the quantitative data do not adequately portray.

A reasonable interpretation of the over-all picture is that females are less concerned with winning, as such, and more concerned with arriving at a fair and friendly solution to the problem. The task for them appears to be to determine a way in which no one suffers at the expense of anyone else. There are several devices by which this sort of outcome can be arranged. First, the prize can be divided equally among all three (triple alliances). Second, sheer luck can be allowed to decide the issue; i.e., without the formation of coalitions, the power relationships established by the drawing of counters can determine who wins. Third, if two are weak, they can, by convention so to speak, join forces. (Our protocols, for the females, show numerous instances where the stronger actually proposed that the other two ally, a phenomenon rare in the male triads.) Fourth, a strong member can voluntarily give points to a weak member (especially striking in Types 3-1-1 and 4-2-1, where no alliance is necessary to win). All of these tactics consistently occur more often in the female triads, leading to the conclusion that their major concern is to reach a fair solution, in contrast to the male emphasis upon winning.

Viewed in this light, the difference between Game-by-Game and Cumulative Score Conditions for the female triads is not a real departure from the feminine role. It is true that there was more bargaining in the more stimulating situation, but it leads to much the same result—more triple alliances, more 50/50 agreements, etc., than in the male triads. Again the protocols show this rather clearly, for the bargaining under both conditions resembles a discussion more than an auction in the case of the females. With a cumulative score, there is an additional matter to consider, one might say, but the problem of the game is the same as before—how to reach a decision maximally acceptable to all concerned.

It can be said, then, that this study has led to a formulation of sex roles that confirms in an empirical interaction situation the pattern that could be deduced both from personality study and sociological role-theory. Interests and character traits, for example, differ for the two sexes, with women typically scoring higher in categories like social activities, "service," "moral knowledge" (2, 13). The well-known *Study of Values* (1) regularly produces higher scores, on the average, for women on the religious, social, and aesthetic scales, with men scoring higher on economic, political, and theoretical scales.

Anastasi and Foley (2), indeed, point out the need for obtaining behavioral confirmation of these patterns, and it is gratifying that the present study is a step in this direction.

Our results are also suggestive as they bear upon the distinction that Parsons (12) has drawn between sex roles in the nuclear family. He conceptualizes a basic instrumental-expressive dimension in terms of "external" vs. "internal" functions of the system. The male role, as primarily instrumental, "concerns relations of the system to its situation outside the system, to meeting adaptive conditions of its maintenance of equilibrium, and 'instrumentally' establishing the desired relations to *external* goal-objects" (12, p. 47). The female role, as primarily expressive, "concerns the 'internal' affairs of the system, the maintenance of integrative relations between the members, and regulation of the patterns and tension levels of its component units" (12, p. 47). By a penetrating analysis of the socialization process, Parsons shows how this differentiation leads to the typical patterns of adult social behavior, with men tending to develop competitive, executive roles, and women supportive, integrating roles. This distinction appears to be well supported by the present results.

Agreement among these diverse sources provides a basis for extensive experimentation with sex roles in interaction settings. Clearly, one must allow carefully for the different contributions made by the two sexes in social situations. The perceptive reader will perhaps be stimulated to raise many interesting questions that are unanswered by the experiments so far reported. One of these queries may concern the fact that three-person groups need not be confined to the same sex, but may consist of two of one sex and a third of the other. If the interpretation presented above concerning the different styles of play is generally sound, then it would indeed be interesting to determine what happens when they operate in mixed-sex triads. A study is under way to find this out; it is one of several experiments which seek to explore other conditions affecting behavior in situations involving various patterns of power.

SUMMARY AND CONCLUSIONS

All-male and all-female triads were compared in a simple game situation where six types of power-pattern could be established. The players competed for a prize, but were free to form coalitions if they wished, and to make their own deals concerning division of the prize. Sixty groups of each sex played 18 games, three of each power type, under two conditions of motivation. In one condition, called "Game-by-Game," each game was played separately; in the other, called "Cumulative Score," a record was kept of points earned during the 18 games. Play was analyzed in terms of outcome, initiation of first offer, agreements reached, and bargaining behavior.

Results lead to the following conclusions:

1. The two sexes, under both motivation conditions, are similar in the general sense that the two weaker members of the triad tend to ally against the stronger in those types of power-pattern where members are unequal in strength but any pair can win by allying, and to form few coalitions when one member is all-powerful.

2. The two sexes differ in the following respects: (a) females more often fail to form coalitions; (b) females more often arrive at triple alliances; (c) females more often form coalitions when none is necessary (that is, when one member can win without alliance); (d) females agree upon less disproportionate divisions of the prize. In addition, there is an indication that females engage in less bargaining, but this difference did not attain the 5 per cent level of significance.

3. The introduction of a cumulative score greatly reduced sex differences, suggesting that the changed incentive condition served to increase interest in the game for the females.

4. It is suggested that differences between the sexes may be accounted for by the fact that males are primarily concerned with winning, whereas females are more oriented towards working out an equitable outcome, as satisfactory as possible to all three participants.

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